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THE MINERAL INDUSTRY

of

PENNSYLVANIA

in

1960

by

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COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF INTERNAL AFFAIRS
Genevieve Blatt, Secretary

TOPOGRAPHIC AND GEOLOGIC SURVEY
Arthur A. Socolow, State Geologist

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The Mineral Industry of Pennsylvania

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By Robert D. Thomson,[1] Mary E. Otte,[2] and Robert E. Ela[3]

PENNSYLVANIA'S mineral output in 1960 was adversely affected by decreased markets. The index of general business activity in Pennsylvania varied from 205 in February (1947–49=100) to 180 in December, the latter being 3 points below the annual index for 1959. The index of industrial activity also declined from 125 in February to 106 in December. Output of several mineral products declined as construction activity decreased. This slowdown in the

TABLE 1.—Mineral production in Pennsylvania[1]

Mineral	1959		1960	
	Quantity	Value (thousands)	Quantity	Value (thousands)
Cement:				
Portland—thousand 376-pound barrels	41,270	$143,054	36,374	$124,122
Masonry—do	2,086	7,864	1,946	7,641
Clays—thousand short tons	3,466	17,196	[2] 3,557	[2] 16,536
Coal:				
Anthracite—do	20,649	172,320	18,817	147,116
Bituminous—do	65,347	345,332	65,425	345,971
Cobalt (content of ore)—pounds	280,098	(3)	(3)	(3)
Gem stones	(4)	3	(4)	4
Lime—thousand short tons	1,263	18,261	1,120	16,277
Natural gas—million cubic feet	99,366	29,015	113,928	36,229
Natural gas liquids:				
Natural gasoline—thousand gallons	2,884	184	1,399	85
LP gases—do	1,484	36	1,580	138
Peat—short tons	26,948	262	30,837	325
Petroleum (crude)—thousand 42-gallon barrels	6,160	25,872	[5] 6,258	[5] 28,474
Sand and gravel—thousand short tons	14,257	23,233	13,011	21,204
Stone—do	43,682	77,420	42,136	74,168
Zinc[6] (recoverable content of ores, etc.)—short tons	16,718	3,828	13,746	3,559
Value of items that cannot be disclosed: Copper, gold, graphite, iron ore, mica, pyrites, sericite schist, silver, soapstone, tripoli, and values indicated by footnote 3	----------	15,812	----------	17,429
Total Pennsylvania[7]	----------	[8] 862,150	----------	824,493

[1] Production as measured by mine shipments, sales, or marketable production (including consumption by producer).
[2] Excludes kaolin; included with "Value of items that cannot be disclosed."
[3] Figure withheld to avoid disclosing individual company confidential data.
[4] Weight not recorded.
[5] Preliminary figure.
[6] Recoverable zinc valued at the yearly average price of Prime Western slab zinc, East St. Louis market. Represents value established after transportation, smelting, and manufacturing charges have been added to the value of ore at the mine.
[7] Total adjusted to eliminate duplicating value of clays and stone in manufacturing lime and cement.
[8] Revised figure.

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State as well as in the Nation was one of the principal factors affecting mineral production in 1960. All major mineral industries except bituminous coal, natural gas, petroleum, and iron ore declined in value of output. Value of mineral production (fuels, metals, and nonmetals) totaled $824 million, a 4-percent decrease.

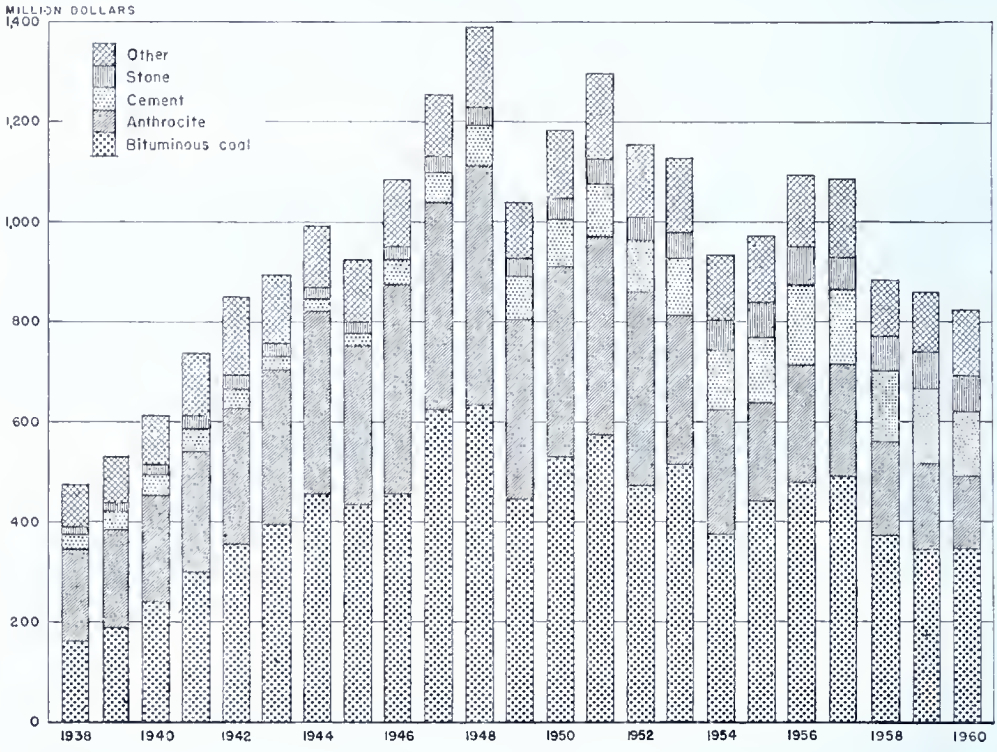

FIGURE 1.—Value of bituminous coal, anthracite, cement, and stone, and total value of mineral production in Pennsylvania, 1938–60.

Employment and Injuries.—Employment in selected mineral industries as shown in table 2 was about 11 percent less than in 1959. Injury experience was much better. A total of 66 fatalities was reported, compared with 89 for 1959, and 2,974 nonfatal lost-time injuries were reported, compared with 3,464 for 1959. The cement industry (including captive-mining operations) had the lowest frequency rate, reporting no fatalities and 20 nonfatal lost-time injuries for a total of 9.8 million man-hours.

The safety record of the bituminous coal industry was better than in 1959; the number of fatalities decreased from 36 to 28 and the number of nonfatal lost-time injuries decreased from 1,208 to 1,150. The number of fatalities per million man-hours was 0.60 compared with 0.69 in 1959. Per million short tons, the frequency rate was 0.43 compared with 0.55 in 1959. The number of nonfatal injuries per million man-hours was 24.77, compared with 23.17 in 1959. Of the fatalities, 25 occurred underground and 3 at strip operations. Roof, rib, and face falls accounted for 12 of the underground fatalities. Of the remaining 13 fatalities at underground mines, 2 were caused by falls of roof from equipment knocking out support; 3, from

TABLE 2.—Employment and injuries for selected mineral industries

Industry	1959		1960[1]				
	Average number of men working	Total man-hours	Average number of men working	Total man-hours	Total number of lost-time injuries		Number of injuries per million man-hours
					Fatal	Nonfatal	
Anthracite	23,294	29,371,307	19,051	24,452,382	35	1,401	58.73
Bituminous coal	36,594	52,146,059	28,100	46,430,000	28	1,150	25.37
Cement[1]	4,342	10,262,697	4,375	9,821,281	--	20	2.04
Clays	662	1,082,302	669	1,032,996	2	156	152.95
Lime[1]	1,445	3,013,844	1,325	2,747,833	--	30	10.92
Sand and gravel	1,391	2,848,893	1,391	2,515,835	--	15	5.96
Stone[2 3]	3,972	7,697,737	4,001	7,823,614	1	202	25.95

[1] Includes quarries or pits producing raw materials used in manufacturing cement or lime for captive operations.
[2] Includes quarry or open-pit employees as well as crushing and screening and rock-dressing operations.
[3] Excludes quarries or pits producing limestone from captive operations used in manufacturing cement or lime.

haulage; 2, from electricity; 5, from machinery; and 1, from mine fires. One of the strip mine fatalities was caused by machinery and the other two resulted from miscellaneous causes.

The anthracite industry in 1960 reported 35 fatalities compared with 47 in 1959. The number of nonfatal lost-time injuries decreased from 1,723 to 1,401. The number of injuries per million man-hours of exposure was 1.43 for fatalities and 57.30 for nonfatalities, compared with 1.60 and 58.66, respectively, for 1959. The number of fatalities per million short tons was 1.85; the number of nonfatalities was 73.98. Of the 35 fatalities 28 occurred underground, 3 at surface operations of underground mines, and 4 at stripping operations. Falls of roof, face, and rib caused 18 (64 percent) of the underground fatalities. Of the remaining 17 fatalities, underground haulage and transportation accounted for 4; bump, 1; rush of materials, 2; fall of persons, 2; and explosives, 1. Causes of the seven fatalities that occurred on the surface were: Squeezed between railroad cars, 1; run over by auto truck, 1; suffocated under rush of culm, 1; transportation at strip mines, 2; rolling rock from high wall, 1; and electrocution at strip mine, 1.

Huber Colliery of Glen Alden Corp. in Luzerne County was the trophy winner of the National Safety Competition for anthracite mines in 1960. The mine was operated for 763,202 man-hours, at an injury-severity rate of 1,741.348. Winners of a Certificate of Achievement in Safety for anthracite mines included Good Springs mine, Penag Coal Co.; Sugar Notch Colliery, Glen Alden Corp.; Tremont mine, Herb and Reed Coal Co.; and Woodward Colliery, Glen Alden Corp. The Maple Creek mine in Washington County was operated by United States Steel Corp. without a lost-time injury and received a Certificate of Achievement in Safety for the bituminous coal group. The Hillsville quarry operated by Michigan Limestone Division, United States Steel Corp. and the Bessemer quarry operated by The Bessemer Limestone and Cement Co. were among the five top contenders for the trophy of the quarry group. Both mines, in Lawrence County, operated in 1960 without lost-time injuries.

Legislation and Government Programs.—In June, the U.S. Supreme Court ruled that depletion allowances for the cement industry could not be computed on the basis of the finished product. Almost simultaneously, Congress passed a law which established kiln feed as a cut-off point for computing percentage depletion for 1960 and subsequent years. Cement companies were given the option to settle open years on the basis of kiln feed or take a chance on final outcome of further litigation. Most cement companies choose the kiln-feed method.

The Pennsylvania State Superior Court reversed a decision of the Public Utility Commission by approving the transfer of cement in bulk and bags by truck from cement plants in eastern Pennsylvania to customers within the State. Previously, trucks could not deliver cement to consumers having rail sidings.

Control facilities provided under the joint Federal-Pennsylvania anthracite mine-water control program at the end of 1960 totaled 11 pumping projects and 13 surface-drainage improvements. The 11 pumping projects required 29 large-capacity deep-well pumps with an average capacity of 143,000 gallons per minute. The 13 surface-drainage improvements consisted of backfilling abandoned strip mines, constructing steel and concrete flumes, and reestablishing surface-drainage over mined areas.

REVIEW BY MINERAL COMMODITIES

MINERAL FUELS

Anthracite.—The downward trend in anthracite output continued, with production totaling 18.8 million short tons, a reduction of 9 percent from 1959. The index of anthracite production (1947–49=100) ranged from a high of 42 in March to a low of 35. The low was 3 points less than that reported in 1959 and 7 points below that of 1958.

Thirty-eight percent of the anthracite was mined from strip pits compared with 34 percent in 1959, and 41 percent was mined from underground mines, compared with 46 percent in 1959. Output from culm banks and dredging remained approximately the same.

Fifty-three percent of the coal produced underground was mechanically loaded; however, 14 percent less coal was mechanically loaded than in 1959—4 million tons in 1960 compared with 4.7 million tons in 1959. A total of 3.7 million tons was hand-loaded compared with 4.7 million tons in 1959. In all, 114 scraper loaders (72 less than in 1959), 45 mobile loaders (1 less than in 1959), and 754 conveyors and pit-car loaders (115 less than in 1959) were used to mechanically load coal mined underground.

Slightly more anthracite was mined from strip pits than in 1959. The 1960 output was 7.1 million tons. A total of 170 power shovels and 222 draglines was used in stripping Pennsylvania anthracite and in recovering culm banks, compared with 168 and 233, respectively, in 1959.

Production from culm banks totaled 3.3 million tons compared with 3.4 million tons in 1959. Operations were active in the Lehigh, Schuylkill, and Wyoming regions and in Sullivan County; the largest output came from the Schuylkill region (1.6 million tons).

Anthracite was produced by dredging the Lehigh, Schuylkill, and Susquehanna Rivers. Production by dredges totaled 712,000 tons, 5,000 tons less than in 1959. Of the total production, 22,700 tons was recovered from the Lehigh River, 23,600 from the Schuylkill River, and 665,800 from the Susquehanna River.

Apparent consumption continued to decrease. A total of 13.8 million tons was shipped outside the producing regions; 5 million tons was sold to local trade; and the remainder was used as colliery fuel. Average value per ton of anthracite was $7.91 for shipments outside the producing regions, $7.60 for local sales, and $5.96 for colliery fuel, compared with $8.53, $7.80, and $5.97, respectively, in 1959.

The average number of men working daily totaled 19,051—4,243 less than in 1959. Of the total, 9,041 were employed at underground mines; 3,470, at strip pits; 585, at culm banks; 3,145, at preparation plants; 2,682, at other surface operations; and 128, at dredging operations. The average number of days active was 176, compared with 173 in 1959. Output per man per day for all types of operations was 5.60 compared with 5.12 in 1959. Output at all operations, excluding dredges, was 5.43, and at dredging operations, 26.40.

Schuylkill County continued to be the principal center for producing anthracite—6.9 million tons in 1960. Luzerne County ranked second with production of 5.7 million tons, followed by Northumberland and Lackawanna Counties. Production also was reported from Carbon, Columbia, Dauphin, Lancaster, Lebanon, Northampton, Snyder, Sullivan, Susquehanna, and Wayne Counties.

Bituminous Coal.—Output from the Pennsylvania bituminous coalfields increased slightly over 1959, despite a 1-percent decrease in production from underground mines. The number of mines in operation decreased 101 in 1960, totaling 1,282 mines producing 1,000 tons or more. The number of active underground mines totaled 680, a decrease of 76 compared with 1959. Strip mines decreased 36 mines to a total of 553; auger mines increased 11, to a total of 49 mines.

Approximately 67 percent of the bituminous coal output came from underground mines, 1 percent or 572,000 tons less than in 1959. Of the total underground production, 43.2 million tons was cut by machines, including that mined by continuous miners; the remainder was cut by hand or shot from the solid. In all, 1,032 cutting machines and 337 continuous miners were used. Locomotives (2,046), animals (439), mother conveyors (338), shuttle cars (1,013), and rope hoists (623) were used for underground haulage. Pennsylvania underground production continued to be highly mechanized; 98 percent of the underground output was mechanically cut, using 1,032 cutting machines, and 94 percent was mechanically loaded by 1,097 machines. Mobile loaders were the principal moving device, loading 10.8 million tons into shuttle cars, 1.9 million tons into mining cars, and 484,000 tons onto conveyors. Handheld and post-mounted drills totaled 805 and drilled 10.2 million tons of coal; 118 mobile drills were used to drill 5.4 million tons of coal.

Output from strip mines increased 3 percent or approximately 569,000 short tons. Bituminous coal was stripped and loaded using electrical, diesel-electric, diesel, and gasoline power shovels and draglines. Of the 936 power shovels in use (38 less than in 1959), 864 had a

capacity of less than 3 cubic yards; 68, 3 to 5 cubic yards; 1, 6 to 12 cubic yards; and 3, more than 12 cubic yards. A total of 362 draglines was used (23 less than in 1959); 148 had a capacity of less than 3 cubic yards; 128, 3 to 5 cubic yards; 76, 6 to 12 cubic yards; and 10, more than 12 cubic yards. Twenty carryall scrapers (one less than in 1959) were used; four had a capacity of 3 cubic yards; one, 3 to 5 cubic yards; nine, 6 to 12 cubic yards; and six, over 12 cubic yards. In addition, 809 bulldozers (68 less than in 1959), 145 horizontal power drills, and 146 vertical power drills were used.

The number of auger mines increased from 38 to 49 in 1960, resulting in a 20-percent increase in tonnage.

Bituminous coal produced from underground mines was shipped chiefly by rail (38.4 million short tons) and by truck (3.9 million short tons). The value per ton of coal produced underground averaged $6.07 ($0.06 greater than in 1959). Underground coal sold on the open market averaged $5.34 per ton. Truck shipments of strip coal to consumers totaled 8.1 million tons, and shipments by rail or water totaled 12.7 million tons. The value per ton of strip-mine coal averaged $3.68 ($0.05 lower than in 1959). Strip-mine coal sold on the open market was valued at $3.68 per ton, ($0.02 less than in 1959). Of the auger mine production, 55 percent was shipped by truck and 44 percent by rail or water. The value of auger-mine coal sold on the open market averaged $3.22 per ton, $0.03 greater than in 1959.

TABLE 3.—Bituminous coal production, by types of mining and counties in 1960

(Exclusive of mines producing less than 1,000 tons annually)

County	Underground		Strip		Auger	
	Number of mines	Short tons	Number of mines	Short tons	Number of mines	Short tons
Allegheny	25	4,633,157	22	566,532		
Armstrong	54	1,220,194	39	1,413,167	10	110,759
Beaver	(1)	(1)	(1)	(1)		
Bedford	(1)	(1)	(1)	(1)		
Blair	(1)	(1)	(1)	(1)		
Bradford			(1)	(1)		
Butler	24	222,941	37	1,790,127	5	51,190
Cambria	86	6,144,416	23	497,690	4	7,273
Cameron			1	106,896		
Centre	11	37,343	17	686,195	2	18,969
Clarion	10	53,578	35	2,673,658	1	9,849
Clearfield	82	1,110,046	106	5,030,090	9	103,338
Clinton	4	10,250	5	469,490		
Elk	16	131,216	10	129,007	(1)	(1)
Fayette	37	1,877,037	30	342,184	1	1,071
Greene	19	9,950,778	1	2,260		
Huntingdon	4	12,984	4	45,661		
Indiana	74	4,285,740	28	744,035	4	49,635
Jefferson	29	218,955	30	919,705	5	35,258
Lawrence	(1)	(1)	21	903,094	(1)	(1)
Lycoming	3	11,399	3	48,604		
McKean			(1)	(1)		
Mercer	3	20,626	6	689,778		
Somerset	101	909,706	43	1,166,224	1	1,331
Tioga	3	22,982	6	278,341		
Venango			11	588,189		
Washington	21	9,864,925	22	991,455	(1)	(1)
Westmoreland	48	3,189,692	20	252,308	(1)	(1)
Undistributed	26	142,595	33	540,843	7	90,499
Total	680	44,070,560	553	20,875,533	49	479,172

[1] Figure withheld to avoid disclosing individual company confidential data; included with "Undistributed."

Eighty-four preparation plants were active, compared with 85 in 1959. A total of 39.6 million tons of coal was cleaned, of which 35.5 million came from underground mines and 4.1 million from strip mines. Of the mine production mechanically cleaned, 34.5 million tons was wetwashed (6.9 million tons by jigs and 27.6 million tons by other methods), and 5.1 million tons was cleaned by pneumatic methods.

At mines having crushing facilities, 31.4 million tons was crushed; this represented 67 percent of the tonnage produced at these mines. Of the total production at these mines, 6.6 million tons was treated—820,000 tons with calcium chloride, 4.4 million tons with oil, 351,000 tons with both calcium chloride and oil, and 991,000 tons with other materials.

Strip mines were active in all 28 counties, underground mines in 24 counties, and auger mines in 14 counties. Greene County replaced Washington County as the leading producer from underground mines; other leading counties in decreasing order were Washington, Cambria, Allegheny, Indiana, Westmoreland, Fayette, Armstrong, and Clearfield. Clearfield County continued as the leading producing county from strip mines, followed by Clarion, Butler, Armstrong, and Somerset. Armstrong County continued to lead in output from auger mines, followed by Clearfield and Indiana Counties.

Coke and Coal Chemicals.—Pennsylvania continued as the leading producing State for beehive and oven coke. Production from oven-coke operations increased 3 percent, principally because of a 6-percent increase in the use of this type of coke in blast furnaces. Production of beehive coke decreased 4 percent mainly because of a 17-percent decline in the use of beehive coke in blast furnaces and a 57-percent decrease in use by foundries.

Fourteen plants, operating 3,792 slot-type ovens (341 less than in 1959), carbonized 20.4 million short tons of coal to produce 14.1 million tons of oven coke. Yield of coke from coal was 69.27 percent, slightly greater than in 1959. The average value of oven coke at the ovens was $17.14 per ton, compared with $16.56 in 1959. Of the oven-coke produced, 96 percent was used in blast furnaces and 1 percent each for foundries and other industrial uses. The remainder was used by producing companies for sundry purposes and for industrial heating.

Thirty-three plants, two less than in 1959, operated 6,208 beehive coke ovens (128 ovens more than in 1959) to produce 684,250 tons of beehive coke. Yield of coke from coal increased from 62.52 to 62.86 percent. The average value of beehive coke at the ovens was $14.18, 42 cents less than that reported in 1959. The beehive coke was used in blast furnaces (73 percent), by foundries, for residential heating, and for sundry industrial uses (26 percent).

Coal produced in Kentucky, Pennsylvania, Virginia, and West Virginia was used at oven-coke plants in Pennsylvania. Of the total, 58 percent came from mines in Pennsylvania and 36 percent from mines in West Virginia. Seventy-seven percent of the coal used at oven-coke plants was high volatile, 8 percent medium volatile, and 15 percent low volatile.

A total of 214 billion cubic feet of coke-oven gas was produced; 40 percent was used in heating ovens, 59 percent was surplus used or sold, and 1 percent was wasted. Thirteen plants produced coke-oven ammonia, totaling 200,873 short tons of sulfate equivalent. A total of 198 million gallons of coke-oven tar was produced; 137 million gallons was used by producers for refining or topping; 17 million gallons. for fuel; and 309,000 gallons, for sundry uses; and 48 million gallons was sold for refining into tar products. Crude light oil, totaling 64 million gallons, was produced at 14 oven-coke plants. Oven-coke plants also produced benzene (36 million gallons), toluene (9 million gallons), xylene (2.7 million gallons), and solvent naphtha (1.9 million gallons).

Peat.—Pennsylvania ranked fourth among the 21 peat-producing States. Tonnage and value of production increased 14 and 24 percent, respectively, compared with 1959. Producers of humus and reed-sedge were active in Erie, Lawrence, Luzerne, and Wayne Counties. Luzerne was the leading county.

Petroleum and Natural Gas.—Output of crude petroleum increased 2 percent in quantity and 10 percent in value. Pennsylvania ranked 20th in the production of petroleum. The average value of crude petroleum at yearend was $4.80 from the Northern or Bradford district, $4.52 from the Middle or Venango district, and $4.25 from the Southwestern district.

Pennsylvania ranked 11th out of the 28 gas-producing States. Output increased 15 percent in quantity and 25 percent in value, compared with 1959.

Exploration resulted in the discovery of one new gasfield, eight new gas pools, and one deeper gas pool.[4] Also several gas-producing areas were extended and a new producing depth record was established for the State. The new producing depth record was established by the Robert I. Snyder No. 1 well in Somerset County when gas was found at 8,574 feet. The outstanding discoveries were the DuBois and Helvetia pools in Clearfield County in the Punxsutawney-Driftwood field and the Baldwin pool of Westmoreland County in the Johnstown field. The greatest density of deep drilling occurred in Clearfield County where 46 gas wells were drilled. As in 1959, Armstrong County had the greatest number of shallow-sand completions outside the secondary-recovery area with the drilling of 54 new gas wells. After drilling a dry hole to the Gatesburgh formation (Upper Cambrian) in each of its two offshore blocks in Lake Erie, the New York State Natural Gas Corp. surrendered its acreage.

Well completions totaled 860 or 212 more than in 1959. Of these, 840 were field wells and 20 wildcat wells. Of the 840 field wells, 256 were oil; 264, gas; 76, dry holes; and 244, service wells. Of the wildcat wells, 5 were gas wells and 15, dry holes. Total footage for completed wells was 2,416,950—an average of 2,810 feet. Footage for completed field wells was 2,297,806 and for wildcat wells, 119,144. Ninety-three percent of the wells were drilled with cable tools and the remainder, by rotary.

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[4] Lytle, Wm. S., Bergsten, John M., Cate, Addison, S., and Wagner, Walter R., Oil and Gas Developments in Pennsylvania in 1960: Pennsylvania Topographic and Geol. Survey, Progress Report 158, 1961, 50 pp.

TABLE 4.—Production of crude petroleum by counties

County	1959		1960	
	Number of producing wells	Production (Barrels)	Number of producing wells	Production (Barrels)
Allegheny	415	128,783	407	123,008
Armstrong	177	12,961	175	12,763
Beaver	150	11,116	141	9,824
Butler	2,611	172,090	2,528	162,702
Clarion	1,025	52,880	1,011	47,908
Crawford	618	29,391	519	25,180
Elk	677	25,632	644	22,736
Fayette	5	277	5	370
Forest	1,000	92,369	1,025	53,325
Greene	315	60,346	313	58,087
Jefferson	91	4,183	91	3,833
McKean	29,323	4,344,379	28,535	4,552,726
Mercer	227	3,650	227	3,549
Potter	418	79,442	418	65,417
Tioga	16	1,532	16	1,197
Venango	17,945	422,177	16,860	373,682
Warren	8,465	274,452	8,117	256,530
Washington	861	180,160	864	177,686
Total	64,339	5,895,820	61,896	5,950,523

Source: Pennsylvania Bureau of Statistics, Department of Internal Affairs.

The proved recoverable crude-oil reserve in Pennsylvania was estimated at 107.6 million barrels on December 31—5.9 million barrels less than was reported at yearend 1959. The proved recoverable reserve of natural gas was 1,192,480 million cubic feet on December 31, 140,000 million more than on December 31, 1959. Of the natural-gas reserve, 714,941 million cubic feet was nonassociated reserve, 22,940 million was dissolved, and 454,599 million was stored in underground reservoirs.

Natural Gas Liquids.—Natural gas liquids produced in Pennsylvania totaled 2,979,000 gallons, valued at $223,000. Output consisted of liquefied petroleum gas and ethane (manufactured at natural-gasoline plants), totaling 1,580,000 gallons, and natural-gasoline and cycle products, totaling 1,399,000 gallons. Average value for liquefied petroleum gases was $0.087 per gallon and for natural-gasoline and cycle products $0.061. Reserves of natural gas liquids on December 31 were estimated at 2.1 million barrels—1.6 million barrels less than at the end of 1959.

NONMETALS

Cement.—Production of cement decreased 9 percent. Output of portland cement decreased 10 percent, that of masonry cement declined 2 percent; shipments of portland and masonry cements decreased 12 percent and 7 percent, respectively.

Kilns operated at approximately 66 percent of capacity and produced 37 million barrels of portland cement. Of the 24 active plants, 64 percent of capacity was dry process and 34 percent, wet process. The industry consumed 919 million kilowatts of electrical energy, about 55 million kilowatts less than in 1959. Seventy-two percent of the electrical energy was purchased from public utility companies, compared with 68 percent in 1959. Stocks of portland cement increased slightly during the year, totaling 5.8 million tons at yearend.

The principal raw materials used for manufacturing portland cement were cement rock and lime. Totals of 7.3 million short tons of cement rock and 3.1 million of limestone were used. In addition, the following tonnages of raw material were used: Gypsum, 316,135; sand, 184,020; clay, 178,104; and iron materials, 63,310. Slag, slate, carbon black, air-entraining compounds, and grinding aids also were used.

Portland cement was shipped to consumers in Pennsylvania, 40 other States, the District of Columbia, and to foreign countries. Thirty-five percent of the shipments went to Pennsylvania; 22 percent to New Jersey; 20 percent to New York; 6 percent to Ohio; 5 percent to Connecticut; 3 percent to Maryland; 2 percent each to Massachusetts and West Virginia; and 1 percent to Virginia.

Distribution of portland cement shipments by use was as follows: 21 million tons to ready-mixed concrete companies, 7.2 million tons to concrete product manufacturers, 5.4 million tons to building material dealers, 248,000 to miscellaneous consumers, 267,000 to other contractors, and 48,000 to Federal, State, and local government agencies.

Masonry cement was shipped to 24 States and the District of Columbia. Forty percent was consumed in Pennsylvania, 18 percent in New Jersey, 15 percent in New York, and 11 percent in Ohio.

TABLE 5.—Portland cement shipments, by counties

County	Number of plants in 1960	1959		1960	
		Barrels	Value	Barrels	Value
Lehigh	4	6,859,370	$23,411,844	6,800,637	$22,739,563
Northampton	12	20,388,750	70,617,280	17,308,898	58,327,559
Allegheny	2	7,086,699	23,991,959	6,323,448	21,754,945
Lawrence	2				
Berks	1	6,935,310	25,032,809	5,940,519	21,299,445
Butler	1				
Montgomery	1				
York	1				
Total	24	41,270,129	143,053,892	36,373,502	124,121,512

Clays.—Pennsylvania ranked second in output of clay, yielding 7 percent of the U.S. tonnage and over 10 percent of the total value. The State also ranked second in fire clay production, fifth in kaolin production, and seventh in the tonnage of miscellaneous clay produced.

Production of fire clay, the most important clay produced in 1960, increased 3 percent over 1959, representing 52 percent of the State clay tonnage and 70 percent of total value. Fire clay was used principally in manufacturing refractory firebrick and block, and heavy clay products; smaller quantities were used in producing other refractories and architectural terra cotta. Thirty-seven percent of the fire clay sold and used was mined underground.

Miscellaneous clay production was 4 percent higher than in 1959. Most of the clay was used in producing heavy clay products; but smaller quantities were used in manufacturing lightweight aggregate, portland cement, art pottery, refractories, and linoleum and oilcloth filler. All of the miscellaneous clay came from open pits.

Output of koalin had declined for 10 years, and 1960 production was well below the 75,415 short tons produced in 1951.

Kaolin used to produce firebrick and block and for manufacturing portland cement was produced in Cumberland and Blair Counties.

TABLE 6.—Clays sold or used by producers, by kinds and uses

(Short tons)

Use	Fire clay		Miscellaneous clay		Kaolin	
	1959	1960	1959	1960	1959	1960
Pottery and stoneware:						
Art pottery, flowerpots, and glaze slip			(1)	12,310		
Refractories:						
Firebrick and block	716,258	837,233	622	(1)	4,745	(2)
Fire-clay mortar	20,575	21,307				
Clay crucibles	(1)	19,511				
Foundries and steelworks	101,747	107,908	(1)	(1)		
Heavy clay products	795,058	748,298	1,309,546	1,306,110		
Portland and other hydraulic cements			202,359	152,126	24,862	(2)
Other uses		13	(1)	(1)		
Undistributed	[3] 169,531	[3] 123,711	[4] 121,058	[4] 228,901		
Total	1,803,169	1,857,981	1,633,585	1,699,447	29,607	(2)

[1] Included with "Undistributed" to avoid disclosing individual company confidential data.
[2] Figure withheld to avoid disclosing individual company confidential data.
[3] Includes floor and wall tile, high-alumina brick, glass refractories, other refractories, and items indicated by footnote 1
[4] Includes floor and wall tile, lightweight aggregate, linoleum and oilcloth, and items indicated by footnote 1.

TABLE 7.—Clays sold or used by producers in 1960, by counties

County	Short tons	Value	Types of clay
Adams	72,255	$36,665	Miscellaneous clay.
Allegheny	132,144	860,092	Do.
Armstrong	216,599	2,116,379	Fire clay.
Beaver	302,812	1,500,715	Fire clay, miscellaneous clay.
Cambria	50,913	265,431	Do.
Chester	81,855	102,319	Miscellaneous clay.
Clarion	99,666	436,204	Fire clay, miscellaneous clay.
Clearfield	541,548	2,997,578	Do.
Columbia	16,416	29,548	Miscellaneous clay.
Fayette	150,016	1,085,171	Fire clay, miscellaneous clay.
Greene	1,600	2,000	Miscellaneous clay.
Lawrence	317,313	793,952	Fire clay, miscellaneous clay.
Luzerne	49,830	99,660	Miscellaneous clay.
Montgomery	87,224	142,188	Fire clay, miscellaneous clay.
Somerset	95,693	889,054	Fire clay.
Washington	29,190	45,236	Miscellaneous clay.
Undistributed [1]	1,312,354	5,134,158	
Total [2]	3,557,428	16,536 350	

[1] Includes Berks, Blair, Bucks, Butler, Centre, Clinton, Cumberland, Dauphin, Elk, Huntingdon, Indiana, Jefferson, Lancaster, McKean, Monroe, Northumberland, Schuylkill, Snyder, and York Counties.
[2] Incomplete total; excludes kaolin produced in Blair and Cumberland Counties.

Gem Stones.—The value of gem stones, including mineral specimens, was higher than in 1959. Eastern Pennsylvania continued to be the most popular source of gem materials. Gem stones were reported to be found in Adams, Chester, Berks, Lancaster, Lehigh, Montgomery, and Northampton Counties. Chester County was the leading county for mineralogical interest, followed by Montgomery County. Most

of the mineral specimens were collected by members of Pennsylvania and out-of-State mineral and lapidary clubs.

Graphite.—Crystalline graphite was recovered from schist in Chester County; production increased in 1960. The processed material was marketed as crucible flake and fine flake for use in manufacturing crucibles and foundry facings. Manufactured (artificial) graphite powder and products were produced at a plant in St. Marys. The graphite powder was sold to steel manufacturers, foundries, and chemical producers.

Iron Oxide Pigments.—Sulfur mud continued to be the only crude iron oxide pigment produced in Pennsylvania; output continued to decrease both in tonnage and value. Production came from Cambria and Elk Counties, mostly from Cambria County.

Pennsylvania continued to be the leading State in producing finished natural and manufactured iron oxide pigments. Output decreased 9 percent in tonnage and 10 percent in value owing chiefly to lower output of natural red iron oxide, manufactured red iron oxide, Venetian red, pyrite sinter, and magnetite. Principal natural iron oxide pigments, based on value, were brown iron oxide, burnt umber, red iron oxide, and burnt sienna. Leading manufactured iron oxide pigments were red, yellow, and black. The finished natural and manufactured iron oxide pigments were produced at one plant in Carbon County and two plants in Northampton County.

Lime.—Production of quicklime and hydrated lime decreased 11 percent as all major uses decreased, compared with 1959. Shipments of chemical and industrial lime were down 12 percent; building lime, down 3 percent; agricultural lime, down 13 percent; and refractory lime, down 14 percent. Of the total lime sold or used, 75 percent was quicklime compared with 78 percent in 1959.

In 1960, 21 companies, 1 more than in 1959, operated 24 plants in 17 counties. Centre County continued as the leading producer with 45 percent of the State's lime production. Centre, York, Lebanon, Chester, Montgomery, and Butler Counties, in decreasing order, each produced over $1 million. Most of the lime output in Pennsylvania was consumed within the State (62 percent), but large quantities were shipped to Maryland (9 percent), New Jersey (7 percent), Ohio (6 percent), New York (6 percent), Delaware (3 percent), and Maine (2 percent).

TABLE 8.—Lime sold or used by producers, by uses

Year	Agricultural		Building		Chemical and industrial		Refractory		Total	
	Short tons	Value (thousands)	Short tons	Value (thousands)	Short tons	Value (thousands)	Short tons	Value (thousands)	Short tons	Value (thousands)
1951–55 (average)	125,970	$1,466	120,665	$1,644	854,965	$9,896	143,403	$1,984	1,245,003	$14,990
1956	360,718	5,140	110,344	1,456	972,368	11,686	(1)	(1)	1,443,430	18,282
1957	286,720	4,469	110,815	1,874	900,866	12,063	(1)	(1)	1,298,401	18,406
1958	193,433	3,077	112,437	1,839	697,188	9,245	(1)	(1)	1,003,058	14,161
1959	253,313	4,023	121,308	2,166	888,559	12,072	(1)	(1)	1,263,180	18,261
1960	221,449	3,478	117,196	2,051	781,818	10,748	(1)	(1)	1,120,463	16,277

[1] Included with "Agricultural" to avoid disclosing individual company confidential data.

TABLE 9.—Lime sold or used by producers, by counties

County	1959		1960	
	Short tons	Value	Short tons	Value
Armstrong	816	$11,466	(1)	(1)
Centre	600,951	8,069,886	504,024	$6,898,746
Dauphin	8,700	121,800	8,400	134,400
Franklin	1,887	14,241	2,301	17,487
Fulton	874	7,866	227	2,043
Juniata	2,200	22,000	2,100	21,000
Lebanon	201,000	2,810,000	176,000	2,493,500
Mifflin	6,670	75,278	4,315	46,363
Northumberland	400	4,000	475	4,000
Snyder	1,289	9,793	(1)	(1)
Undistributed [2]	438,393	7,114,596	422,621	6,658,973
Total	1,263,180	18,260,836	1,120,463	16,276,512

[1] Figure withheld to avoid disclosing individual company confidential data
[2] Includes Bedford, Blair (1960), Butler, Chester, Lancaster, Montgomery, and York Counties, and counties indicated by footnote 1.

Magnesium Compounds.—Decreased demand for magnesium compounds, chiefly as magnesium oxide for insulation and for use in manufacturing rubber, contributed to the decline in output of magnesium compounds from Pennsylvania plants. Magnesium carbonate, produced at Plymouth Meeting from raw dolomite, was used in producing precipitated magnesium oxide.

Mica.—Output of scrap mica increased owing to a greater demand for ground mica by the paint and rubber industries. The mica was mined and processed near Glenville.

Block and film mica was fabricated by Sylvania Electric Products, Inc., at its Titusville plant. Mica splittings were consumed by General Electric Co., Erie, and Westinghouse Electric Co., Pittsburgh, to produce built-up mica.

Mullite, Synthetic.—Synthetic mullite, essentially $3Al_2O_3 \cdot 2SiO_2$, was produced by Remmey Division of A. P. Green Firebrick Co. at a plant in Philadelphia. Production increased compared with 1959.

Perlite (Expanded).—Perlite mined in western States was expanded at plants in Allegheny, Delaware, Lehigh, Montgomery, and York Counties. Sales of expanded perlite totaled 17,434 tons, valued at $1,092,161, and less was marketed than in 1959, mainly because of decreased demand in building plaster and loose fill installation. The expanded perlite also was used as a concrete aggregate, soil conditioner, filler, and as a filter aid.

Pyrite.—A much greater tonnage of pyrite was produced than in 1959. Pyrite concentrate, obtained as a byproduct of iron ore mining in eastern Pennsylvania, was processed to recover pyrite and cobalt.

Sand and Gravel.—Sand and gravel production totaled 13,011,176 tons valued at $21,204,193 and was 9 percent below 1959 in both tonnage and value. More than 86 percent of the commercial output was used as building and paving sand and gravel and totaled 11,227,586 tons; 55 percent was consumed as building material and 31 percent as paving material. Industrial sand produced in 16 counties

represented 18 percent of the total sand produced. The largest concentration of industrial sand was in the south-central part of Pennsylvania, chiefly in Huntingdon and Mifflin Counties. Less than 2 percent of the total sand and gravel produced reached consumers as unprepared material.

The number of operations extracting sand and gravel totaled 110, of which 32 in 24 counties produced over 100,000 tons. Production from these 32 plants totaled 10,321,029 tons valued at $17,093,452, representing 80 and 81 percent, respectively, of the State total. Pennsylvania ranked 18th in tonnage of sand and gravel produced and furnished 2 percent of the U.S. total.

Commercial production of sand and gravel was reported from 45 of the 67 counties. Clinton County was the only county reporting Government-and-contractor operations during the year. Despite a substantial decrease in both tonnage and value, Bucks County continued as the leading producer. Of the total commercial sand and gravel tonnage, 65 percent was transported by truck; 9 percent, by railroad; and the remainder, by waterway and other means.

TABLE 10.—Sand and gravel sold or used by producers, by classes of operations, and by uses

Class of operation and use	1959		1960	
	Short tons	Value	Short tons	Value
Commercial operations:				
Sand:				
Molding	173,104	$483,130	(1)	(1)
Building	3,824,920	5,476,084	3,802,203	$5,461,055
Paving	2,148,497	3,218,653	2,063,029	3,106,240
Fire or furnace	105,868	380,094	141,183	395,826
Engine	77,213	192,675	(1)	(1)
Fill			101,233	117,341
Undistributed [2]	1,355,703	4,566,873	1,241,546	4,394,246
Total	7,685,305	14,317,509	7,349,194	13,474,708
Gravel, Construction:				
Building	4,037,098	5,385,540	3,369,786	4,557,919
Paving	2,200,930	3,270,382	1,992,568	2,877,280
Fill			102,029	89,725
Undistributed [3]	301,295	247,053	29,034	32,436
Gravel, miscellaneous			84,710	70,039
Total	6,539,323	8,902,975	5,578,127	7,627,399
Total sand and gravel	14,224,628	23,220,484	12,927,321	21,102,107
Government-and-contractor operations:				
Sand: Building	50	180		
Total	50	180		
Gravel: Fill	32,336	12,385	83,855	102,086
Total	32,336	12,385	83,855	102,086
Total sand and gravel	32,386	12,565	83,855	102,086
Grand total	14,257,014	23,233,049	13,011,176	21,204,193

[1] Included with "Undistributed" to avoid disclosing individual company confidential data.
[2] Includes glass, grinding and polishing, blast, ferrosilicon (1960), ground, and other sand.
[3] Includes railroad ballast and other uses.

TABLE 11.—Sand and gravel sold or used by producers, by counties

County	1959		1960	
	Short tons	Value	Short tons	Value
Allegheny	(1)	(1)	121,113	$257,290
Armstrong	(1)	(1)	1,516,924	3,096,258
Bedford	7,015	$19,993	(1)	(1)
Blair	(1)	(1)	42,822	101,093
Bradford	46,500	63,000	(1)	(1)
Butler	133,780	193,618	161,200	221,400
Cambria	8,000	26,000	7,950	7,950
Carbon	224,523	331,898	(1)	(1)
Clearfield	4,000	9,000		
Clinton	32,336	12,385	83,855	102,086
Crawford	142,330	179,678	103,616	164,174
Cumberland	171,778	313,370	175,180	302,582
Erie	260,322	342,261	(1)	(1)
Fayette	162,000	397,000	166,928	280,106
Franklin	145,311	216,946	(1)	(1)
Jefferson			18,857	7,911
Lancaster	(1)	(1)	229,846	491,678
Luzerne	450,930	553,192	428,859	542,523
Mercer	(1)	(1)	314,821	484,178
Monroe	(1)	(1)	63,187	70,888
Northampton	(1)	(1)	425,168	498,163
Northumberland	6,978	8,853	6,853	8,096
Philadelphia	607,047	485,637	(1)	(1)
Schuylkill	105,639	319,161	118,443	284,564
Snyder			102,940	102,801
Somerset	990	2,870	(1)	(1)
Susquehanna	478,500	287,100		
Venango	302,616	560,750	(1)	(1)
Wayne	(1)	(1)	2,678	2,411
York	414,261	566,943	279,647	395,222
Undistributed [2]	10,552,158	18,343,394	8,640,289	13,782,819
Total	14,257,014	23,233,049	13,011,176	21,204,193

[1] Included with "Undistributed" to avoid disclosing individual company confidential data.
[2] Includes Beaver, Berks, Bucks, Columbia, Dauphin, Elk, Forest, Fulton, Huntingdon, Lackawanna (1960), Lawrence, Lycoming, McKean, Mifflin, Montgomery, Montour (1960), Warren, and Wyoming Counties, unspecified counties (1960), and counties indicated by footnote 1.

Slag (Iron-Blast Furnace).—Output of blast furnace slag increased from 7,240,000 in 1959 to 7,804,000 short tons. However, the value of output decreased $196,000, totaling $11,651,000. Pennsylvania continued to be the leading producer of blast-furnace slag with 27 percent of the U.S. tonnage. Of the slag processed in Pennsylvania, 76 percent was screened air-cooled slag used chiefly as an aggregate in portland cement concrete construction, bituminous construction of various types, highway and airport construction, and railroad ballast.

Stone.—Production of stone (including slate and oystershell) decreased in both tonnage and value (4 percent each). The decline was due mainly to a lower demand for dimension building stone and crushed and broken stone for railroad ballast, concrete aggregate, and refractory material. The demand for curbing and flagstone, riprap, flux, and agricultural stone, increased.

Stone (comprised of basalt, granite, miscellaneous stone, sandstone, limestone, slate, and oystershell) was produced in 50 of the 67 counties. New operations were reported in Cambia, Lackawanna, Philadelphia, and Washington Counties. Northampton County was the leading stone-producing county. Counties producing over $3 million, in decreasing order were: Northampton, Montgomery, Lawrence,

York, Adams, Chester, Centre, Berks, and Lancaster. In addition, Bucks, Dauphin, Delaware, Lebanon, and Lehigh Counties each produced over $2 million worth of stone, and Blair, Butler, Huntingdon, Mifflin, and Westmoreland Counties produced over $1 million, each.

Output of limestone, the leading stone produced, decreased 3 percent in both tonnage and value, chiefly because of a drop in demand for crushed and broken stone as a raw material for producing lime and cement, asphalt filler, stone sand, and dimension building stone. Increases were reported in the use of limestone as flux 11 percent, railroad ballast doubled, riprap 20 percent, and agricultural stone 7 percent. Crushed limestone was produced in 37 counties—2 more than in 1959; new operations were reported in Washington and Westmoreland Counties. Northampton County continued to lead in output of crushed limestone, with 5 million tons compared with 5.8 million tons in 1959 followed in decreasing order by counties producing over 2 million tons—Montgomery, Lawrence, York, Lancaster, Lehigh, and Berks. Dimension limestone production continued in Bucks County. No production of dimension stone was reported for Lancaster County.

Output of basalt (diabase), the stone that ranked second in Pennsylvania, decreased 22 percent in tonnage and 28 percent in value, mainly because of a 16-percent decrease in the demand for its use as concrete aggregate and a 40-percent decline in its use as railroad ballast. Less basalt also was used as building stone and for miscellaneous purposes. More basalt was used than in 1959 for riprap and dimension stone. Use of basalt for curbing and flagging stone was reported as a new use in 1960. Crushed basalt was reported in seven counties, one less than in 1959. No production was reported from Westmoreland County. Delaware was the leading county followed by Chester, Berks, Bucks, and Montgomery Counties. Dimension basalt was produced in Bucks, Chester, and Montgomery Counties; Montgomery County was the leading area.

Sandstone ranked third as stone in Pennsylvania tonnage-wise, and led in value. It was marketed as both dimension and crushed stone. Output was greater than in 1959, increasing 21 percent in tonnage and 13 percent in value. Crushed sandstone production increased 23 percent over that in 1959; more was used as concrete aggregate and for miscellaneous uses; and less was used for riprap, railroad ballast, and as refractory material. Production of dimension sandstone, based on value, decreased slightly. Greater quantities of dimension stone were used as rough architectural stone, rubble, and curbing and flagging; less was used as rough and dressed construction building stone and sawed or dressed building stone. Crushed sandstone was produced in 20 counties and dimension sandstone, in 11 counties. New operations were reported in Adams, Berks, Cambria, Chester, and Lackawanna Counties. Westmoreland was the leading county for crushed sandstone based on tonnage, and Carbon County led, based on value. Other leading counties were Adams, Blair, Huntingdon, Luzerne, Montgomery, Schuylkill, Susquehanna, and Wayne. No production of dimension stone was reported from Mercer County. Noncommercial production of crushed stone was reported in Wayne County.

Granite was prepared and marketed both as dimension stone and as crushed stone. Production of dimension granite was less than in 1959 because of a lower demand for building stone. New production of granite as crushed stone was reported in Montgomery County. Granite also was crushed by the Pennsylvania Highway Department in Philadelphia.

The tonnage of miscellaneous stone as dimension stone and as crushed stone increased. Output of dimension stone increased 6 percent, owing mainly to a greater demand for rough and dressed construction stone, although less was used for rubble and curbing and flagging. Production of crushed miscellaneous stone increased because of a greater demand in concrete aggregate. Crushed miscellaneous stone production continued in Bucks and Montgomery Counties. Dimension miscellaneous stone was produced in Delaware, Lycoming, Montgomery, Potter, and Westmoreland Counties; most of the output came from Delaware County.

Oystershell was again collected in Berks County and processed for agricultural use.

Output of slate was slightly less than in 1959. However, Pennsylvania continued to lead in slate production. Sales of dimension slate decreased 5 percent below 1959. Use of slate for roofing, blackboards and bulletin boards, billiard tabletops, and flagging declined, but structural and sanitary, school slates, and miscellaneous uses increased. The demand for slate granules and flour was slightly greater than in 1959. Dimension slate was produced by 1 company in Lehigh County and 11 companies in Northampton County. The dimension slate came mostly from Northampton County. Crushed slate was marketed from Lycoming, Northampton, and York Counties. York County led in production. The three producers in Northampton County and one producer in Lycoming County also produced dimension slate.

Output of natural and artificially colored roofing granules decreased in both tonnage and value compared with 1959, owing mainly to a decreased demand for natural granules. Of the total production,

TABLE 12.—Stone sold or used by producers, by uses

Use	1959		1960	
	Short tons	Value	Short tons	Value
Dimension stone:				
Building stone	176,989	$1,344,896	153,304	$1,142,813
Curbing and flagging	12,118	289,281	12,493	306,897
Other uses	50,134	3,320,679	48,834	3,165,132
Total	239,241	4,954,856	214,631	4,614,842
Crushed and broken stone:				
Riprap	10,032	11,657	51,842	74,834
Concrete and road metal	20,443,307	31,491,790	20,363,634	31,284,466
Furnace flux (limestone)	5,076,505	9,393,129	5,637,623	10,657,545
Railroad ballast	736,546	1,196,019	569,253	913,223
Agricultural	888,123	2,518,380	950,509	2,852,574
Other uses [1]	16,287,967	27,854,836	14,348,797	23,770,386
Total	43,442,480	72,465,811	41,921,658	69,553,028
Grand total	43,681,721	77,420,667	42,136,289	74,167,870

[1] Includes "refractory."

artificially colored granules represented 76 percent, compared with 74 percent in 1959 and 87 percent in 1958. Plants were active in Adams, Beaver, and York Counties.

TABLE 13.—Stone sold or used by producers, by counties

County	1959		1960	
	Short tons	Value	Short tons	Value
Adams, Cumberland, Franklin	2,906,992	$6,260,476	(1)	(1)
Berks	2,911,256	3,922,354	2,559,740	$3,431,652
Blair, Huntingdon	1,153,003	3,110,245	1,196,838	3,107,357
Bucks	1,714,805	2,962,656	(1)	(1)
Butler	877,883	1,757,108	829,202	1,647,700
Cambria			4,800	15,400
Carbon, Monroe, Schuylkill	431,930	1,814,413	497,376	1,901,063
Centre	2,120,484	4,275,778	1,889,695	3,806,576
Chester	2,506,541	5,347,571	2,341,341	4,770,842
Dauphin	(1)	(1)	1,467,521	2,332,238
Fayette, Somerset	633,560	1,336,633	530,651	1,135,453
Franklin	(1)	(1)	608,415	994,155
Juniata, Mifflin, Snyder	(1)	(1)	798,124	1,539,381
Lackawanna			5,072	10,144
Lancaster	2,508,298	3,763,864	2,292,968	3,263,486
Lawrence	2,884,686	5,155,072	2,912,743	5,017,918
Lebanon	1,853,672	3,126,445	1,669,667	2,816,853
Lehigh, Northampton	8,047,822	11,152,655	7,257,026	9,470,565
Luzerne	211,109	345,458	195,248	310,969
Mercer	13,235	49,690	14,211	49,971
Montgomery	3,661,015	6,326,769	4,066,352	7,129,105
Northumberland	53,400	94,280	43,880	77,159
Philadelphia			11,350	28,815
Snyder	77,999	135,935	(1)	(1)
Tioga	115	2,800	(1)	(1)
Union	282,028	464,487	278,933	461,463
Wayne	(1)	(1)	199,124	357,299
Westmoreland	567,190	1,068,130	567,955	1,023,678
Wyoming	(1)	(1)	2,161	50,400
Undistributed [2]	8,264,698	14,947,848	9,955,896	19,418,228
Total	43,681,721	77,420,667	42,136,289	74,167,870

[1] Figure withheld to avoid disclosing individual company confidential data.
[2] Includes Allegheny, Armstrong, Bedford, Clarion, Clinton, Delaware, Fulton, Lycoming, Montour, Perry, Potter, Susquehanna, Washington (1960), and York Counties, and counties indicated by footnote 1.

Sulfur.—Byproduct sulfur continued to be recovered in the liquid purification of oil refinery gases obtained from domestic and foreign sources. Production was less than that reported in 1959. The Sinclair Refining Co., Marcus Hook refinery and the Gulf Oil Corp., Philadelphia refinery, used the Claus process to recover sulfur.

The Atlantic Refining Co. (Philadelphia) recovered hydrogen sulfide by the Girdler process and burned it to sulfur dioxide for use in making sulfuric acid at the local plant. Sulfur also was recovered at the Sun Oil Co., Marcus Hook refinery, using a two-stage catalytic oxidation of hydrogen sulfide.

Output of byproduct sulfuric acid (100 percent H_2SO_4) at zinc smelters and zinc roasters totaled 323,519 short tons, valued at $4,990,000. New Castle Chemical Co., which for 50 years furnished sulfuric acid mainly for the Youngstown, Ohio, steel industry, ceased business in 1960.

Talc.—Output of pyrophyllite (sericite-schist) and soapstone decreased, mainly because of a lower demand for these materials as a filler in asphaltic compounds, insecticides, and joint cement. The sericite-schist was processed at Aspers, and the soapstone was trans-

ported to a plant near Marriottsville, Carroll County, Md., for processing.

Tripoli.—Lower demand for buffing compounds and filler material contributed to decreased production of tripoli (rottenstone). The crude material was ground at two plants in Lycoming County.

Vermiculite (Exfoliated).—Crude vermiculite from other States and foreign countries was exfoliated at plants in Lawrence and Bucks Counties. The exfoliated vermiculite was used in building plaster, lightweight concrete, loose-fill installation, and other applications.

METALS

Cadmium.—Primary metallic cadmium was produced from flue dust recovered at the St. Joseph Lead Co., Josephtown plant and the New Jersey Zinc Co., Palmerton smelter.

Cobalt.—Production of cobalt as a byproduct of iron ore mined in Pennsylvania increased over that produced in 1959.

Copper.—Production of copper from ores produced in Pennsylvania increased over that of 1959. The copper was recovered in concentrate produced at the Lebanon concentrator. The concentrate was shipped to a smelter at Laurel Hill, N.Y.

Ferroalloys.—Production and shipments of ferroalloys were greater than in 1959, increasing 38 percent and 11 percent, respectively. Shipments totaled 476,865 short tons valued at $116,212,148 and consisted chiefly of ferromanganese, spiegeleisen, ferromolybdenum, and ferrocolumbium. In addition, smaller quantities of ferrotungsten, ferroboron, nickel-columbium, aluminum-vanadium, nickel-tungsten, molybdenum-aluminum, and ferrovanadium were shipped.

Gold and Silver.—Output of gold and silver increased over 1959. These metals were recovered from a copper concentrate produced at the Lebanon concentrator.

Iron Ore.—Iron ore production increased over 1959. Magnetite ore from the Cornwall and Grace underground mines was shipped to the Lebanon and Morgantown concentrators, respectively, for processing. Concentrate from the Lebanon concentrator and a small quantity of concentrate fines from the Morgantown concentrator were processed in the agglomerating plant at the Lebanon concentrator. Shipments from the Lebanon plant consisted of concentrate and agglomerates (sinter and pellets), for use in producing pig iron and steel. Shipments from the Morgantown concentrator consisted principally of concentrate for direct use in producing pig iron and steel. In order to treat the ore mined from the Cornwall mine more efficiently, construction work was started on a new concentrating and agglomerating plant in Cornwall. The new facilities will replace the existing treatment plant at Lebanon.

Iron and Steel Scrap.—Ferrous scrap was collected and prepared chiefly in Coatesville, Conshohocken, Glassport, Harrisburg, Philadelphia, Pittsburgh, and Sharpsburg. Plants reporting monthly averaged 62, which represented only a small part of the industry. Stocks on hand at the yards for dealers, brokers, and automobile wreckers totaled 191,000 short tons on December 31. The leading varieties of scrap processed and shipped were No. 1 heavy melting steel,

No. 2 and all other bundles, cast-iron scrap and other borings, and No. 1 and electric furnace bundles. A total of 13,501,711 short tons of ferrous scrap was reported as consumed by companies in Pennsylvania. Stocks of ferrous scrap held by all consumers at yearend were 1,899,850 short tons.

TABLE 14.—Pig iron and ferrous scrap consumption by type of furnace

(Short tons)

Type of furnace and raw material	1959	1960	Type of furnace and raw material	1959	1960
Open-hearth furnaces:			Air furnaces:		
Pig iron	13,301,590	13,807,676	Pig iron	47,064	47,307
Scrap	9,960,128	9,543,920	Scrap	148,385	153,956
Total	23,261,718	23,351,596	Total	195,449	201,263
Bessemer converters: [1]			Blast furnaces:		
Pig iron	752,653	1,009,202	Scrap	1,027,609	1,124,042
Scrap	275,731	339,546	Total	1,027,609	1,124,042
Total	1,028,384	1,348,748	Miscellaneous uses:		
Electric steel furnaces: [2]			Pig iron (direct casting)	1,116,514	1,197,319
Pig iron	27,047	24,729	Scrap [3]	86,648	70,419
Scrap	1,774,097	1,723,268	Total	1,203,162	1,267,738
Total	1,801,144	1,747,997	Total:		
Cupola furnaces:			Pig iron	15,489,188	16,295,129
Pig iron	244,320	208,896	Scrap	13,866,340	13,501,711
Scrap	593,742	546,560	Total	29,355,528	29,796,840
Total	838,062	755,456			

[1] Includes scrap and pig iron consumed in the basic oxygen converter.
[2] Includes small quantity used in crucible furnaces.
[3] Includes ferroalloy, reforging, and rerolling.

Lead and Zinc Pigment.—Red lead and litharge were manufactured by National Lead Co., in Philadelphia, and black oxide was produced by Electric Storage Battery Co., in Philadelphia, and Price Battery Corp., in Hamburg. Zinc oxide for pigment purposes was manufactured by New Jersey Zinc Co., Palmerton; St. Joseph Lead Co., Josephtown; Superior Zinc Corp., Bristol; and Rohm and Haas Co., Bristol. In addition, New Jersey Zinc Co. produced leaded zinc oxide.

Molybdenum.—Molybdenite concentrate was converted to molybdic oxide by Climax Molybdenum Co. at its Langeloth plant, Washington County, and by Molybdenum Corporation of America at its Washington plant, Washington County. Both firms produced ferromolybdenum and other molybdenum products at these plants. The molybdenite concentrate consumed by Climax Molybdenum Co. was from the firm's operation in Climax, Colo., and that consumed by Molybdenum Corporation of America was obtained mainly from the Utah Copper Division of Kennecott Copper Corp. Molybdenum Corporation of America produced ammonium molybdate and other molybdenum compounds at its York plant, York County.

Pig Iron.—Contrary to expectations for a near-record year, the demand for steel products was reduced owing to reduction of inventories and gradual reduction for steel in important areas such as construc-

tion, heavy machinery, and containers. Despite this, pig iron production totaled 16.5 million short tons, a 9-percent increase over 1959. The pig iron was produced at 21 plants having 73 stacks. Basic, Bessemer, foundry, low-phosphorous, malleable, and direct-casting types of pig iron were produced.

More basic and Bessemer pig iron were produced than other classes; basic represented 87 percent of the total or 14.5 million short tons. Shipments of pig iron totaled 16.2 million tons valued at $973,815,000. In blast furnaces, raw material consumption totaled 7.4 million tons of domestic iron ore, 5.5 million tons of foreign iron ore, 4.2 million tons of limestone and dolomite, 846,000 tons of mill cinder and roll scale, 17,000 tons of flue dust, 1.3 million tons of open-hearth Bessemer slag, 12.3 million tons of coke, 153,000 tons of pig iron and 922,000 tons of home and purchased scrap, 180,000 tons of slag scrap, 9.6 million tons of sinter, 953,000 tons of pellets, and 329,000 tons of foreign agglomerates. In addition, manganiferous ore, coke breeze, anthracite, self-fluxing agglomerates, briquets, and other miscellaneous materials were consumed in making pig iron. A total of 3.7 million tons of domestic iron ore, 290,000 tons of mill cinder and roll scale, 1.4 million tons of flue dust, and quantities of foreign iron ore, manganiferous ore, limestone and dolomite, coke breeze, and anthracite were consumed in agglomerating plants in Pennsylvania to produce sinter and self-fluxing agglomerates.

Smelters.—The Palmerton and Josephtown smelters were active; however, production at Palmerton was adversely affected by a strike. The Palmerton plant of New Jersey Zinc Co. processed concentrate from company operations at Friedensville, Pa.; Austinville, Va.; Jefferson City, and Treadway, Tenn.; Canyon City, Colo.; and other domestic and foreign sources. Zinc was the primary product of the smelter. From May 19 to July 13, improvements at this plant involved converting the vertical retort furnaces, refineries, and metal oxide furnaces to natural gas fuel from fuel formerly made from coal. Savings in operating costs were reported to be substantial. The Josephtown plant of St. Joseph Lead Co. processed zinc concentrate received from the company's Edwards and Balmat, N.Y., and Indian Creek, and Leadwood, Mo., operations, as well as material from other States and foreign countries. The Josephtown smelter operated 48 hours per week during the entire year. The zinc content of the metal produced at the smelter was 146,732 tons for the year, compared with 128,670 tons for 1959. Scrap zinc materials made up a large part of the smelter feed in 1960. To handle this, a new secondary materials plant was built and became fully operative in July.

Zinc.—Production of zinc concentrate was adversely affected by a strike which closed the Friedensville mine from August 5 to November 26. Production declined 18 percent in tonnage during the year. The ore produced at the Friedensville mine was concentrated at a nearby plant, and the concentrate was shipped to the Palmerton smelter for processing. Mine drainage was still a major problem. Rerouting of water made ore available from the 600-foot level, and limited production was done below the water table from the 600- and 800-foot levels. The 700- and 800-foot levels were developed further to facilitate drainage and haulage.

REVIEW BY COUNTIES

Adams.—Total stone output increased 23 percent over 1959. Bethlehem Limestone Co., subsidiary of Bethlehem Steel Co., quarried and crushed limestone at a quarry and plant west of Hanover, chiefly for blast furnace flux, road material, and stone sand. Liberty Stone & Supply Co., Inc. (Fairfield), quarried and crushed limestone for concrete aggregate and roadstone. The Funkhouser Mills Division of the Ruberoid Co. crushed basalt from the Charmian quarry east of Charmian in Adams County; and quartzite was crushed from a quarry nearby for use as roofing granules, tennis court surfacing, and stone dust as an asphaltic filler. Teeter Stone, Inc., subsidiary of H. T. Campbell Sons' Corp., quarried traprock in Gettysburg for use as concrete aggregate and roadstone.

Liberty Stone Co. produced soapstone at a pit near Fairfield and transferred the crude material to its Marriottsville, Md., plant for processing. Summit Industries, Inc., recovered sericite-schist at the Heller No. 3 mine, 3 miles west of Bendersville. The crude material was trucked to the company plant at Aspers to be crushed, screened, and ground, chiefly for use as a filler in asphaltic compounds and joint cement. The crude material at this mine was depleted during the year, and mining was started in Cumberland County.

Production of miscellaneous clay was almost the same as in 1959. Clay recovered from open pits by Alwine Brick Co. (New Oxford) and Gettysburg Drain Tile Works (Gettysburg) was used to manufacture building brick and draintile.

Allegheny.—Bituminous coal was produced from underground and strip mines; underground tonnage comprised 89 percent of the output. Twenty-five underground mines were active—four less than in 1959. A total of 86 cutting machines cut 4.6 million tons of coal, and about the same quantity of coal was mechanically loaded. Of the mechanically cleaned coal, 99 percent was washed, with jigs representing 28 percent. Twenty-two strip mines, five less than in 1959, produced coal, using 32 power shovels and 7 draglines. The capacity of most draglines and shovels was less than 3 cubic yards.

Shipments of cement again declined. Green Bag Cement Co. (formerly Pittsburgh Coke & Chemical Co.) manufactured mostly portland-pozzolan cement and some masonry cement by the wet process. It operated three 175-by-10-foot rotary kilns at its plant at Neville Island. Universal Atlas Cement, Division of U. S. Steel Corp., produced general-use and moderate-heat portland cement and mortar cement by the dry process at the company plant at Universal. Shipments were mostly intrastate and to West Virginia and Ohio.

Output of miscellaneous clay declined for the third consecutive year and was only 3 percent above the previous low of 1956. Milliken Brick Co., Inc., mined clay from an open pit near Wilkinsburg and continued as the largest of seven clay producers in the county. Miscellaneous clay was mined from other pits near Bridgeville, Creighton, McKeesport, Pitcairn, and Pittsburgh. Rebuilding and remodeling kept the Allegheny Brick Co. inactive, but the company plans to resume operations in 1961.

TABLE 15.—Value of mineral production in Pennsylvania [1 2 3]

County	1959	1960	Minerals produced in 1960 in order of value
Adams	(4)	(4)	Stone, sericite-schist, clays, soapstone.
Allegheny	$43,462,995	(4)	Coal, cement, clays, sand and gravel, stone.
Armstrong	(4)	(4)	Coal, sand and gravel, clays, lime, stone.
Beaver	(4)	(4)	Clays, coal, sand and gravel.
Bedford	(4)	(4)	Stone, coal, lime, sand and gravel.
Berks	13,690,800	$13,229,516	Cement, iron ore, stone, clays, sand and gravel.
Blair	2,218,760	(4)	Stone, coal, clays, sand and gravel, lime.
Bradford	87,881	(4)	Sand and gravel, coal.
Bucks	(4)	(4)	Sand and gravel, stone, clays.
Butler	14,803,739	14,099,030	Coal, cement, lime, stone, sand and gravel, clays.
Cambria	42,242,812	40,686,920	Coal, clays, stone, sand and gravel, iron ore (pigment material).
Cameron	171,706	292,965	Coal.
Carbon	(4)	(4)	Coal, stone, sand and gravel.
Centre	(4)	(4)	Lime, coal, stone, clays.
Chester	(4)	(4)	Stone, lime, clays, graphite, gem stone.
Clarion	(4)	(4)	Coal, stone, clays.
Clearfield	26,836,053	27,526,100	Coal, clays.
Clinton	2,708,633	2,343,929	Coal, stone, clays.
Columbia	(4)	(4)	Coal, sand and gravel, clays.
Crawford	179,678	164,174	Sand and gravel.
Cumberland	(4)	(4)	Stone, sand and gravel, sericite-schist, clays.
Dauphin	3,317,375	3,918,994	Stone, coal, clays, sand and gravel, lime.
Delaware	2,608,524	(4)	Stone.
Elk	1,370,674	1,243,645	Coal, sand and gravel, clays, iron ore (pigment material).
Erie	(4)	(4)	Sand and gravel, peat.
Fayette	(4)	(4)	Coal, clays, stone, sand and gravel.
Forest	(4)	(4)	Sand and gravel.
Franklin	(4)	(4)	Stone, sand and gravel, lime.
Fulton	(4)	(4)	Do.
Greene	61,165,085	63,349,280	Coal, clays.
Huntingdon	4,931,074	4,834,112	Sand and gravel, stone, coal, clays.
Indiana	(4)	(4)	Coal, clays.
Jefferson	(4)	(4)	Coal, clays, sand and gravel.
Juniata	(4)	(4)	Stone, lime.
Lackawanna	19,614,830	(4)	Coal, sand and gravel, stone.
Lancaster	(4)	(4)	Stone, coal, sand and gravel, clays, lime, gem stone.
Lawrence	(4)	(4)	Cement, stone, coal, clays, sand and gravel, peat.
Lebanon	16,449,766	16,272,894	Iron ore, lime, copper, stone, cobalt, pyrite, gold, coal, silver.
Lehigh	(4)	(4)	Cement, zinc, stone, gem stone.
Luzerne	(4)	(4)	Coal, sand and gravel, stone, peat, clays.
Lycoming	1,806,045	1,489,284	Stone, sand and gravel, coal, tripoli.
McKean	436,981	439,400	Clays, coal, sand and gravel.
Mercer	2,585,092	3,156,941	Coal, sand and gravel, stone.
Mifflin	(4)	(4)	Sand and gravel, stone, lime.
Monroe	(4)	(4)	Stone, clays, sand and gravel.
Montgomery	13,964,287	14,071,756	Stone, cement, lime, clays, sand and gravel, gem stone.
Montour	(4)	(4)	Stone, sand and gravel.
Northampton	(4)	(4)	Cement, stone, sand and gravel, coal, gem stone.
Northumberland	(4)	(4)	Coal, clays, stone, sand and gravel, lime.
Perry	(4)	(4)	Stone.
Philadelphia	485,638	(4)	Sand and gravel, stone.
Potter	(4)	(4)	Stone.
Schuylkill	65,530,404	54,881,224	Coal, stone, sand and gravel, clays.
Snyder	548,014	614,357	Clays, coal, stone, sand and gravel, lime.
Somerset	(4)	(4)	Coal, clays, stone, sand and gravel.
Sullivan	81,311	97,845	Coal.
Susquehanna	(4)	(4)	Stone, coal.
Tioga	1,217,688	(4)	Coal, stone.
Union	464,487	461,463	Stone.
Venango	2,616,378	(4)	Coal, sand and gravel.
Warren	(4)	(4)	Sand and gravel.
Washington	64,510,269	(4)	Coal, stone, clays.
Wayne	(4)	(4)	Stone, peat, coal, sand and gravel.
Westmoreland	19,643,023	19,823,493	Coal, stone.
Wyoming	(4)	(4)	Sand and gravel, stone.
York	15,875,371	13,814,831	Cement, stone, lime, sand and gravel, clays, mica.
Undistributed	[5] 416,524,816	527,680,429	
Total	[5] 862,150,000	824,493,000	

[1] Pike County is not listed because no production was reported.
[2] Excludes value of production for LP gases, natural gasoline, petroleum, natural gas, and some gem stone and sand and gravel unspecified by counties; included with "Undistributed".
[3] Excludes value of clays and stone used in manufacturing lime and cement.
[4] Included with "Undistributed" to avoid disclosing individual company confidential data.
[5] Revised figure.

The only industrial sand produced in southwestern Pennsylvania came from plants near Acmetonia and Pittsburgh. Output of construction sand and gravel and industrial sand totaled 121,113 tons and marked the second consecutive year that a substantial increase had been reported over the preceding year.

Malli Mines, Jefferson Borough, produced dimension sandstone for use as flagging and as irregular-shaped building stone. Nick Gioia quarried dimension sandstone in Elizabeth Township for use as rubble.

Panacalite Perlite Co. (Pittsburgh) and Perlite Manufacturing Co. (Carnegie) expanded perlite obtained from Nevada and New Mexico. The material was sold or used mainly in building plaster and loose-fill insulation.

Armstrong.—Fifty-four bituminous coal underground mines, 39 strip mines, and 10 auger mines were active. This represented an increase of three strip mines and one auger mine, and a decrease of four underground mines. Slightly more coal was produced from strip mines than from underground mines. Fifty-six power shovels and 20 draglines were operated; 51 of the power shovels had less than 3-yard capacity; 10 draglines had 3-yard capacity; and 6 had between 3- and 5-yard capacity. Of underground production, 86 percent was mechanically loaded, and 35 percent was mechanically cleaned. Pneumatic and other washing methods were used for cleaning the coal.

Armstrong County remained the largest sand and gravel producing county in western Pennsylvania and continued to rank second in the State in total quantity and value. The output from four plants was used mainly as building and paving material. Shipments to consumers were made by truck, waterway, and railroad.

Combined output of clay from six underground mines—one each at Adrian, Freeport, New Bethlehem, and Templeton, and two at Kittanning—and two open pits—one each at Craigsville and Worthington—totaled 217,000 tons. The fire clay was used to manufacture firebrick and block, building brick, and vitrified sewer pipe. Haws Refractories Co. did not operate its Bridgeburg underground mine during the year.

Three lime companies (all near Kittanning) produced hydrated lime for agricultural purposes. Limestone, quarried and crushed at two operations near Kittanning, was used solely for manufacturing lime.

Beaver.—Despite a 21-percent decrease Beaver County continued to rank second as a clay-producing county. Four underground mines yielded 90,000 tons of fire clay, which was used chiefly in manufacturing building brick. Fire clay from open pits was used for firebrick and block, clay crucibles, foundries and steelworks, building brick, and vitrified sewer pipe. Miscellaneous clay produced from an open pit near New Brighton was used to manufacture heavy clay products. Friedl-Elverson Pottery Co. discontinued mining and purchased material from an outside source. McQuiston Coal Co. completed mining operations near Darlington and began to backfill its property.

Ninety-eight percent of the bituminous coal production came from strip mines. The remainder was obtained from underground mines. Twenty-four power shovels, 13 draglines, and 17 bulldozers were used at the stripping operations. At underground mines, three cutting

machines and two loading machines were used; 59 percent of the production was mechanically loaded. None of the coal was mechanically cleaned.

Iron City Sand & Gravel Corp. dredged sand and gravel from newly acquired property in Beaver County and established the area as the third largest in the State. Other producers were Lee Block Co. near Industry, and Shippingport Sand & Gravel Co. near Shippingport.

Bedford.—Two companies produced and crushed limestone near Everett and Hyndman for use as concrete aggregate, roadstone, agricultural stone, asphalt filler, dust for coal mines, and lime manufacture. Leap Ganister Rock Co. produced ganister rock at its Leap No. 1 quarry near Madley. The stone was crushed and sized at a local plant for use as furnace or converter linings. Martin Quarries produced and crushed sandstone at a quarry near Bechtelsville.

Sixty-three percent of the bituminous coal production came from underground mines. Of the underground production, 40 percent was mechanically loaded, and none was mechanically cleaned. At the strip mines, three power shovels, two draglines, four bulldozers, and two horizontal power drills were used.

New Enterprise Lime & Stone Co. produced and sold hydrated agricultural lime at its Ashcom plant near Everett. J. Mason Kerr (Hyndman) operated a one-pot kiln and sold quicklime for agricultural purposes.

Building sand was processed by Feight Bros. and transported by truck to consumers.

Berks.—General-use and moderate-heat and high-early-strength portland and masonry cements were produced by the dry process at the No. 1 five-kiln plant of Allentown Portland Cement Co. (Evansville). Output was shipped mostly in bulk by railroad to ready-mixed concrete companies. Shipments were largely intrastate, but significant quantities also were shipped to New York, New Jersey, and Connecticut.

Bethlehem Cornwall Corp., subsidiary of Bethlehem Steel Co., continued to produce crude iron ore at its Grace underground mine near Morgantown by block caving, open stope, and shrinkage stoping. The crude ore was processed at the local company concentrator by flotation and magnetic concentration.

Tonnage and value of stone decreased 12 percent and 13 percent, respectively. Four companies continued operating six limestone quarries—two near Evansville, and one each near South Temple, Sinking Spring, Kutztown, and Oley. Output was sold or used mostly as concrete aggregate, roadstone, and in manufacturing of cement. Eighty-six percent of the stone produced was shipped by truck. Basalt, crushed or broken for use as railroad ballast and road material, was recovered from the Clingan quarry near Birdsboro by The John T. Dyer Quarry Co. Two new operators, Pottstown Trap Rock Quarries, Inc., Douglasville, and Bradford Hills Quarry, Inc., Morgantown, quarried diabase solely for use as roadstone. Reading Poultry Food Co., Reading, crushed oystershell for use as poultry grit and mineral food.

Miscellaneous clay and shale taken from open pits by the Reading Shale Division and Shoemakersville Division of Glen-Gery Shale Brick Corp. was used to manufacture building brick.

Prepared sand and gravel by two producers, one near Sinking Spring, and the other near Temple, was hauled to consumers by truck.

Blair.—Production and value of stone was slightly less than in 1959. Six companies continued operating seven quarries near Roaring Springs, Canoe Creek, Hollidaysburg three, Altoona, and Claysburg. Output was used chiefly as concrete aggregate and roadstone, and for agricultural purposes. The leading producer was New Enterprise Stone & Lime Co. Quartzite was quarried and crushed for use in making silica brick by General Refractories Co., Frankstown, and J. L. Hartman, Sproul. General Refractories Co. discontinued operations at its Claysburg quarry. Basalt Traprock Co. produced and crushed quartzite at its quarry and stationary plant near Williamsburg, chiefly for railroad ballast and road material.

Coal production came mostly from strip operations.

Blair County was one of two counties producing kaolin. Kaolin mined at the Grannas No. 1 mine near Williamsburg was used to manufacture refractories. Miscellaneous clay and plastic fire clay were also produced in limited quantities.

Building sand was recovered from two pits in the southern part of the county near Hollidaysburg. Material mined near Frankstown was processed and used as building gravel.

Chimney Rocks Lime & Stone Co. (Hollidaysburg) produced hydrated lime for agricultural use.

Bradford.—Two plants near Towanda were able to supply the increased demands for building and paving sand and gravel.

Bituminous coal also was produced.

Bucks.—Output of sand and gravel (all processed) declined sharply from that of 1959; however, the county continued to lead in tonnage and value of output. Shipments of construction sand and gravel, for use chiefly as building and paving material were made by waterway, truck, and railroad. The following leading producers each produced more than 100,000 tons: Amico Sand & Gravel Co. (Morrisville), B & M Sand & Gravel, Inc. (Upper Black Eddy), and Warner Co. (Philadelphia).

Crushed limestone was produced by four companies operating quarries near Buckingham, Eureka, Rushland, and New Hope, solely for use as concrete aggregate and roadstone. Edward Karpinski (Langhorne) produced dimension limestone for use in rough construction work. Dimension diabase for use as rough and dressed construction stone and crushed or broken diabase as road material was quarried by Edison Quarry (Edison). Coopersburg Granite Co., east of Coopersburg in Bucks County, quarried dimension stone for dressed architectural and monumental stones, and rubble. Four operators near Quakertown, Weisel, Telford, and Ottsville quarried and crushed diabase solely for concrete aggregate and roadstone.

Samuel M. Yoder Estate operated the Blooming Glen quarry and crushing plant, producing redstone and bluestone, and George Wiley operated Wiley's quarry (bluestone) near Point Pleasant. Both companies quarried and crushed sandstone for use as concrete aggre-

gate and roadstone. Better Materials Corp., Penns Park, produced crushed and broken miscellaneous stone (argillite) and sold or used the stone as concrete aggregate and roadstone.

Quakertown Brick & Tile Co., Inc., mined miscellaneous clay for building brick from an open pit near Quakertown.

Butler.—Bituminous coal was produced from 24 underground mines, 37 strip mines, and 5 auger mines, representing 1 additional strip mine, 2 auger mines, and 4 less underground mines than in 1959. Thirty-eight cutting machines and 16 loading machines were used in the underground mines; 58 percent of the production was mechanically loaded. Fifty-nine power shovels, 33 draglines, 1 carryall, and 53 bulldozers were used at the strip mines. Only 26 percent of the coal was mechanically cleaned, all by jigs.

General-use and moderate-heat and high-early-strength portland cement and some mortar cement were manufactured by the wet process by Penn-Dixie Cement Corp. at its No. 9 plant, West Winfield. Two 250 feet by 10 feet 6 inches rotary kilns were fed crushed captive limestone. Cement was shipped intrastate, mostly by truck in bulk to ready-mixed concrete companies. Small quantities were shipped to New York, West Virginia, and Ohio.

Quicklime and hydrated lime were produced by Mercer Lime & Stone Co. at its plant one-half mile west of Branchton, and marketed for chemical and industrial uses. Some hydrated lime was sold for agricultural purposes.

Output of limestone was slightly less than in 1959, although four companies continued to produce from quarries near West Winfield, Harrisville, and Branchton. The stone was crushed for use as concrete aggregate, roadstone, cement manufacture, and agricultural purposes.

Highway Sand & Gravel Co., Inc., produced building sand and gravel for local and general sales. H. W. Cooper produced sand and gravel and processed sand for fill and gravel for miscellaneous uses.

Miscellaneous clay output was used in manufacturing cement and building brick. Having ceased mining at the beginning of the year, McCrady Refractories, Inc., used clay from its stockpile and clay purchased from outside sources. Glenn R. Boosel, after mining a small quantity of flint fire clay, discontinued operations June 1. Pittsburgh & Erie Coal Co. was liquidated during 1960.

Cambria.—Eighty-six underground mines, 23 strip mines, and 4 auger mines were worked for bituminous coal. This was six less underground mines, four less strip mines, and three more auger mines than were worked in 1959. Ninety-two percent of the production came from underground mines, 7 percent from strip mines, and the remainder from the auger mines. One hundred and forty-two cutting machines and 182 loading machines were used in the underground operations; 96 percent of the underground production was mechanically loaded. Forty-eight power shovels, 14 draglines, 30 bulldozers, 7 horizontal power drills, and 6 vertical power drills were used at the strip mines. Approximately 73 percent of the coal production was mechanically cleaned, about 60 percent by pneumatic methods.

The Hiram Swank's Sons, Inc., Swank No. 24 mine remained the only active underground clay mine in the county at the end of the

year; however, lack of orders caused periods of limited production throughout the year. Patton Clay Manufacturing Co. discontinued operating its No. 1 underground mine September 1, and leased the property to Joseph Shero. Triangle Clay Products Co. became the leading clay producer in the county. Miscellaneous clay produced by Triangle Clay Products Co. at its open pit near Johnstown was used in manufacturing building brick. North Cambria Fuel Co. produced plastic fire clay for manufacturing vitrified sewer pipe.

Nicosia Stone Quarry, Johnstown, produced crushed sandstone for making silica brick and for road material. Parry Sand & Gravel Co. near Johnstown supplied sand and gravel for home construction. Lanzendorfer Minerals Co. produced iron oxide pigments of the sulfur mud variety from its No. 31 mine near Nanty Glo. The material was sold for use in making paint pigments.

Cameron.—The entire production of bituminous coal came from one strip mine. Three power shovels, one dragline, and three bulldozers were used at this mine.

Carbon.—Anthracite from underground mines, strip pits, and culm banks totaled 661,165 short tons. Seventy-five percent of the output was shipped outside the producing region; the remainder was sold locally. The principal producers of anthracite were Pollock Trucking Co., Sullivan Trail Coal Co., and Coaldale Mining Co.

Valuewise, Carbon County led in producing sandstone; output increased slightly over that of 1959. Quartzite used in making silica brick was produced at the Little Gap quarry and crushed at the Palmerton plant of North American Refractories. Crushed and broken sandstone used mainly for road material was quarried at the Red Rock quarry near Nesquehoning by James and Paul Fauzio.

Alliance Sand Co., producing only sand for use as building and paving material and for manufacturing cement, ranked 16th in the State for total sand and gravel production. Two other companies produced sand and gravel for construction material.

Centre.—Despite decreases of 16 percent in quantity and 15 percent in value, Centre County remained the leading lime-producing area. Three producers operated rotary limekilns near Bellefonte. Quicklime and hydrated lime were marketed chiefly for chemical and industrial uses; smaller quantities were sold for agricultural and building uses.

Two auger mines, 11 underground mines, and 17 strip mines produced bituminous coal. Strip mines produced 92 percent of the county output; 34 power shovels, 13 draglines, and 28 bulldozers were used. At the underground operations, four cutting machines, three loading machines were used; 32 percent of underground production was loaded mechanically. None of the coal was mechanically cleaned.

Both tonnage and value of limestone (the only stone produced in the county) declined 11 percent. Chief uses of the limestone were for concrete aggregate, roadstone, lime manufacture, open-hearth flux, glassmaking, and dust for coal mines. Six companies produced crushed and broken stone, principally from quarries near Bellefonte, Pleasant Gap, and State College.

Fire clay produced by Harbison-Walker Refractories Co. was used in manufacturing firebrick and block.

Chester.—Total output of stone was slightly less than in 1959. Bradford Hills Quarry, Inc., crushed limestone at a quarry and plant near Downingtown for use as road material. Some of the stone was sold to local government agencies for road construction. The Cedar Hollow plant at Devault, operated by Warner Co., Bellefonte Division, yielded crushed limestone for use as road material, blast-furnace flux at chemical plants, agricultural purposes, and in manufacturing refractories and lime. Quicklime and hydrated lime chiefly for sewage and trade-waste treatment, paper manufacture, and agricultural use were produced at the Cedar Hollow plant. The company's Johnson quarry and plant near Paoli yielded limestone solely for use as concrete aggregate and roadstone. Valley Forge Stone Co. (Malvern) produced crushed limestone for use as road material. Limestone was sold to local government agencies as roadstone.

V. DiFrancesca, Devault, quarried and crushed diabase for use as road material. Keystone Trappe Rock Co., Glenmoore, produced crushed and broken diabase for road material and railroad ballast. In addition to crushed and broken diabase for use as riprap, French Creek Granite, Saint Peters, produced dimension dressed architectural stone, ornamental stone for monuments and mausoleums, and curbing. Some of the dimension stone was used on the exterior of the Federal Office Building in Richmond, Va.

John Fecondo & Sons, Albert Rotunno, and Abram T. Minor, all near Avondale, quarried dimension sandstone (bluestone) as irregular-shaped construction stone, rubble, and flagging. Dimension sandstone for use as irregular-shaped construction stone and rubble was quarried by Bacton Hill Quarry, Malvern. The stone from the Bacton Hill quarry was used on the exterior of the Allstate Insurance Building (King of Prussia, Montgomery County) and Kaufmann's Department Store (Monroeville, Allegheny County).

Quicklime and hydrated lime chiefly for sewage and trade-waste treatment, paper manufacture, and agricultural use were produced at the Cedar Hollow plant of Warner Co. Hydrated lime also was sold for building lime.

Graphite Corp. of America produced crystalline flake graphite near Chester Springs for use in crucibles and foundry facings.

McAvoy Vitrified Brick Co. used miscellaneous clay and shale produced from an open pit at Phoenixville to manufacture building brick.

Clarion.—Clarion County again ranked second in strip mining bituminous coal, with 13 percent of the State's strip-mine tonnage. Seventy-four power shovels, 32 draglines, and 46 bulldozers were used at the 35 (4 more than in 1959) active strip mines. Smaller quantities were produced by 10 underground mines and 1 auger mine. Forty-three percent of the coal was mechanically cleaned, 58 percent by jigs, and 42 percent by other wet methods.

Allegheny Mineral Corp. crushed limestone for concrete aggregate, roadstone, and agricultural purposes at a quarry and plant east of Parker.

Flint fire clay produced from four underground operations was used exclusively for refractories. Plastic fire clay was mined from two open pits for use in manufacturing heavy clay products.

Harbison-Walker Refractories Co. abandoned its Lucinda underground clay mine.

Clearfield.—Clearfield County led in production of bituminous coal from strip mines. One hundred and six active strip mines, the same number as in 1959, yielded 5 million tons. Two hundred and fifteen power shovels, 81 draglines, 4 carryalls, 178 bulldozers, 36 horizontal power drills, and 40 vertical power drills were used at strip operations. Production from 82 underground mines, 6 less than in 1959, totaled 1.1 million tons. Of the coal mined underground, 1 million tons was cut by 112 cutting machines, and 710,000 tons was mechanically loaded. A total of 489,000 tons of coal was wetwashed, and 584,000 tons was cleaned, using pneumatic methods.

Clearfield continued as the principal clay-producing area in the State; the total output of 542,000 short tons was 13 percent above 1959 but 6 percent below the high of 577,000 short tons established in 1957. Clay-mining, by 12 companies, was all from open pits. Eight companies produced under contract or marketed their entire production of plastic and flint fire clays for manufacturing refractory firebrick and block. Miscellaneous clay produced by Robinson Clay Products, Inc., and Williams Grove Clay Co. was used in manufacturing heavy clay products. Hiram Swank's Sons, Inc., conducted exploration and development work at its Swank No. 27 underground mine. This work was limited to tunneling and crosscutting. Due to economic conditions, the company ceased underground mining operations December 16.

Clinton.—Bituminous coal was mined from four underground mines and five strip mines, one less strip mine than in 1959. Strip mines used 12 power shovels and 7 draglines to produce 469,000 tons of coal. Only one cutting machine was used underground, and none of the production was mechanically loaded. Only 36 percent of the county production was mechanically cleaned.

Crushed and sized limestone for use as concrete aggregate, roadstone, and railroad ballast was produced by Lycoming Silica Sand Co. (Salona). Some roadstone was sold to the Pennsylvania Department of Highways.

Union Mining Co., Inc., purchased the Kelsey Mining Co. on January 1. Diaspore-type fire clay, produced by the new owners, was marketed for use in manfacturing high-alumina brick. Miscellaneous clay mined under contract for Mill Hall Clay Products Co., Inc., was used in manufacturing heavy clay products.

Columbia.—Anthracite was mined from strip mines, underground mines, and culm banks. Leading producers were Jeddo-Highland Coal Co., Raven Run Coal Co., and Reading Anthracite Co.

Bloomsburg Sand & Gravel Co. produced building sand and gravel from a pit and processing plant near Bloomsburg.

The Alliance Clay Product Co. mined miscellaneous clay for manufacturing building brick on property near Mifflinville, leased from Lloyd E. Eister.

Crawford.—Sand and gravel production was 27 percent below the high of 142,000 tons produced in 1959. State and local governments and other consumers nearby used the output of four plants for ready-

mixed concrete, bituminous and antiskid material, road base and road repairs, highway drainage, and as building material.

Cumberland.—Crushed limestone for use as road material was produced by Valley Quarries, Inc. (Shippensburg), and Hempt Bros., Inc. (Camp Hill). Locust Point Stone Quarries (Mechanicsburg) produced roadstone and agricultural limestone.

The sand and gravel industry, consisting of three plants recorded its best year since 1955. Sand and gravel production totaled 175,000 tons and represented a 2-percent increase over 1959.

Summit Industries, Inc., recovered sericite schist from the Herman mine near Goodyear. The crude material was transported to the company mill at Aspers (Adams County) for processing.

Cumberland County was the leading of two kaolin-producing counties. Kaolin mined from an open pit near Mount Holly Springs by Philadelphia Clay Co. was used almost entirely in making white cement. Increased demands for kaolin, which began early in 1960, did not continue throughout the year, and production declined slightly below the 1959 level. The Penn Products Corp. sold a small quantity of stoneware clay for manufacturing floor and wall tile.

Dauphin.—Four companies reported crushing limestone at plants near Steelton, High Spire, Camp Hill, and northwest of Palmyra. Chief uses of the stone were for concrete aggregate, roadstone, blast-furnace flux, and stone sand. Taylor Lime & Stone Co. (Elizabethville) quarried and crushed stone for road material. The Pennsylvania Department of Highways purchased some stone for road construction.

Less than 20 percent of the anthracite mined from underground mines, strip pits, and culm banks was consumed by local trade.

Output of miscellaneous clay and shale was 5 percent below 1959. Bethlehem Limestone Co. recovered miscellaneous clay from an open pit near Steelton, and sold it for use in making foundry refractories and protective coating for pipes. Glen-Gery Shale Brick Corp. used shale from its open pits near Harrisburg and Royalton in manufacturing building brick.

Material processed by Highspire Sand & Gravel Co., Ltd., and Pennsylvania Supply Co. was used exclusively as paving sand and gravel.

H. E. Millard Lime & Stone Co. burned hydrated lime for agricultural use at its Swatara plant near Hershey.

Delaware.—In Delaware County, granite gneiss production decreased 29 percent in tonnage and 18 percent in value. V. DiFrancesca & Sons, Freeborn quarry (Havertown), Llanerch quarry and crusher (Llanerch), and General Crushed Stone Co., Glen Mills quarry, crushed granite gneiss for use as concrete aggregate and roadstone. In addition granite gneiss for railroad ballast was recovered at the Glen Mills quarry. Media Quarry Co. (Media) quarried dimension sandstone for rubble and rough construction. Dimension granite was recovered at two quarries, near Lima and Swarthmore, for use as dressed and irregular-shaped construction stone. Three quarries in the central part of the county near Media, Springfield, and Marple Township yielded dimension miscellaneous stone (mica schist) used as rough and dressed structural stone and rubble.

Perlite Products, Inc. (Primos), expanded perlite from crude material obtained from Colorado. The material was sold or used chiefly as building plaster and as a mix with asphalt for insulating material.

Fenix & Scisson, Inc., completed a liquid propane underground storage cavern for Sun Oil Co. The 400,000-barrel capacity cavern was blasted out of granite underlying the Sun Oil Marcus Hook Refinery. The company has two additional nearby caverns, each with a capacity of 250,000 barrels, for butane storage.

Elk.—Bituminous coal was produced at 16 underground mines (19 in 1959), 10 strip mines (7 in 1959), and an undisclosed number of auger mines. Slightly more coal was produced underground than from strip mines. Of the coal mined underground, 85 percent was cut by machine, and 82 percent was mechanically loaded. Only a small percent of the county production was mechanically cleaned; wet-washing methods were used.

Paving gravel and building sand and gravel were processed by Stone Haven Mix (Johnsonburg) and C. A. Hoffman Gravel Co. (Ridgway), respectively.

Plastic fire clay was produced by St. Marys Sewer Pipe Co. for making vitrified sewer pipe.

From the Brandy Camp mine (Brandy Camp) William DeSalve recovered sulfur mud, which was sold for manufacturing paint pigments.

Speer Carbon Co. (Saint Marys) manufactured graphite (artificial) for use by steel manufacturers and chemical companies.

Erie.—Erie County was one of three industrial sand-producing counties in northwestern Pennsylvania. The industry, consisting of four plants, used rail and truck transportation to supply consumers with building and paving sand and gravel, miscellaneous gravel, and molding sand.

Corry Peat Products Co. recovered reed-sedge and humus peat from a bog in the southeastern part of the county near Corry.

Fayette.—Bituminous coal was produced at 37 underground mines (41 in 1959), 30 strip mines (31 in 1959), and 1 auger mine. Thirty cutting machines and 36 loading machines were used underground; 94 percent of the output was cut by machines, and 66 percent was loaded mechanically. Three draglines, 27 power shovels, and 26 bulldozers were used at the strip mines. Fifty-eight percent of the total production from all mines was mechanically cleaned, using both wet-wash and pneumatic methods.

Combined output of clay from five open-pit mines continued upward and was only 6 percent below the high of 159,000 tons set in 1957. Miscellaneous clay and fire clay were produced by Layton Fire Clay Co. for use in making refractory firebrick and block, building brick, and other heavy clay products. Fire clay produced by Harbison-Walker Refractories Co., Kaiser Refractories & Chemical Division, Robert N. Matthews, and John Hustosky was used chiefly for manufacturing refractory firebrick and block.

Fry Coal & Stone Co., Division of American-Marietta Co., operated the Lake Lynn quarry (formerly owned by Vesco Corp.) and produced crushed, ground, and sized limestone for use as concrete aggregate,

roadstone, dust for coal mines, and for agricultural purposes. Crushed and ground ganister rock for making silica brick was produced at the Childs operation near Layton by General Refractories Co. Connellsville Bluestone Co., Connellsville, produced crushed and broken sandstone (bluestone) as road material and sold some of the stone to the Pennsylvania Department of Highways and various townships for road construction. Dimension sandstone (bluestone) for rough construction also was quarried near Connellsville.

McClain Sand Co., Inc., used truck, railroad, and waterways to transport its finished product to customers.

Small quantities of sand and gravel were sold to the U.S. Army Corps of Engineers and the Pennsylvania Department of Highways.

General Chemical Division of Allied Chemical Corp. produced cinder at its Newell plant for use in refractories and cement.

Forest.—Tionesta Sand & Gravel, Inc. (Tionesta), processed sand and gravel for construction uses. J. & J. Sand & Gravel Co. (Rimersburg), operating only 2 months, processed bank run material, mined from a pit near Clarington.

Franklin.—Production of stone totaled 608,000 short tons, a 15-percent decrease from 1959. Crushed limestone for use as concrete aggregate, roadstone, railroad ballast, for agricultural purposes, and for making lime, was reported by six companies operating seven quarries. Quarries were active near Mercersburg, Zullinger, Dry Run, Chambersburg, Williamson, and Shippensburg.

Building sand was the only sand product processed.

Frank L. Heinbaugh (Mercersburg) produced quicklime in its 3-shaft-kiln plant, and sold it for agricultural use. Bituminous coal was used as fuel.

Fulton.—H. B. Mellot Estate, Inc., produced limestone at the Morton quarry (Big Cove Tannery) and the Charlton quarry (Warfordsburg). The stone was crushed at local plants chiefly for use as concrete aggregate and roadstone, and a quantity was used for agricultural purposes. John P. Martz & Son crushed limestone for making lime at its Martz Draw Kiln near Hustontown. The lime was marketed for agricultural use.

Sand, produced by H. B. Mellot Estate, Inc. (Warfordsburg), was marketed chiefly as paving sand for highways.

Greene.—Greene was the leading county in output of bituminous coal from underground mines; production totaled 10 million tons. Nineteen underground mines were active, the same number as in 1959. All but a small fraction of the underground production was cut by machine and loaded mechanically. One strip mine was active. Seventy-three percent of the county production was mechanically cleaned, using jigs and other wet methods.

Greene County Clay Products Co. mined miscellaneous clay from an open-pit operation near Waynesburg. The clay was used to manufacture building brick.

Huntingdon.—Huntingdon County ranked third in value of sand and gravel and continued as the leading industrial sand-producing county in the State. Industrial sands produced at the Pennsylvania Glass Sand Corp., Keystone Works were used as glass, molding, and engine sand, and for other industrial uses. In addition, the company pro-

duced ground sand for use in making enamel, foundry molds, glass, pottery, and abrasives.

New Enterprise Stone & Lime Co. recovered limestone from the McConnelstown quarry for use as concrete aggregate and roadstone. Its Orbisinia quarry was not operated during the year. Warner Co., Bellefonte Division (Union Furnace) quarried and crushed limestone as concrete aggregate, roadstone, railroad ballast, and riprap. Harbison-Walker Refractories Co. (Mount Union) and North American Refractories Co. (Three Springs) quarried and crushed quartzite for making silica brick at local plants.

Bituminous coal was produced at four underground mines (nine in 1959) and four strip mines (five in 1959). Only 46 percent of the underground tonnage was cut by machine, and none was mechanically loaded. Eight power shovels and three draglines were used at the four strip pits. None of the output from the underground mines or the strip mines was mechanically cleaned.

Two companies produced fire clay for making refractories. That produced by Alexandria Fire Clay Co. was sold on the open market; output of Harbison-Walker Refractories Co. was captive.

Indiana.—Production of bituminous coal from 74 underground mines, 28 strip mines, and 4 auger mines totaled 5 million tons. Indiana County ranked fifth in output of coal from underground mines. One hundred and two cutting machines and 124 loading machines were used. Virtually the entire underground production was mechanically cut and loaded. At the 28 strip mines, 50 power shovels, 17 draglines, and 50 bulldozers were used. Seventy-two percent of the total output was mechanically cleaned, using jigs, other wet methods, and pneumatic methods.

In addition to the fire clay mined at its No. 6 underground mine, Hiram Swank's Sons, Inc., purchased fire clay produced at the L. H. Foehrenbach strip-mining operation near Clymer. The product from these mines was used to produce sleeves, nozzles, stoppers, and other refractory materials.

Jefferson.—Bituminous coal was produced from 29 underground mines (30 in 1959), 30 strip mines (29 in 1959), and 5 auger mines (4 in 1959). At the underground mines, 40 cutting machines and 18 loading machines were used; 47 percent of the coal was mechanically loaded. Only 7 percent of the county output was mechanically cleaned. Only jigs were used to clean the coal.

Flint and plastic fire clays were produced. Flint fire clay, mined underground by Henry O'Neill & Co., was used in manufacturing firebrick and block. Plastic fire clay, mined from two open pits near Brockway and from an underground mine near Summersville, was used to manufacture vitrified sewer pipe, building brick, and tile.

Gravel for building, paving, and railroad ballast was produced at the Brockway Sand & Gravel Co. plant near Brockway.

Juniata.—Limestone used for concrete aggregate and roadstone was quarried near Mifflintown by W. N. Quigley. Local and nearby government agencies purchased stone for road construction. Fulkroad Lime Quarry (McAllisterville) used its limestone output solely for producing lime for agricultural use, using anthracite as fuel. Kaiser

Aluminum & Chemical Corp. recovered quartzite and crushed it for making silica brick at the Van Dyke plant near Thompsontown.

Lackawanna.—Production of anthracite declined from 2.1 million tons in 1959 to 1.8 million tons. Despite the decline the county ranked fourth in tonnage and third in value. Operators producing over 100,000 tons were Hudson Coal Co. and Moffat Coal Co., Inc.

Contractors Sand & Gravel, Inc., supplied the Pennsylvania Department of Highways and contractors with building and paving materials. Keystone Pavement & Construction Co., Inc., used part of its output as a prime contractor and sold building and paving sand and gravel to the Pennsylvania Department of Highways and local consumers.

Crushed and broken sandstone was quarried for road material at the West Mountain quarry near Scranton by Stabler Construction Co.

Lancaster.—Production of dimension limestone ceased in the county. The tonnage and value of crushed and broken limestone decreased 9 percent and 13 percent, respectively; output totaled 2,293,000 short tons.

Thirteen companies operated 15 quarries and plants (each 1 less than in 1959) near Bainbridge, Morgantown, E. Petersburg, Ephrata, Gap, Lititz, Landisville, Rheems, Denver, Blue Ball, Quarryville, and Talmage. Leading producers were D. M. Stoltzfus & Son, Inc., Bradford Hills Quarry, Inc., and Ivan M. Martin, Inc. L. F. Zook & Sons (Bareville) discontinued operations during the year. Most of the crushed stone was sold or used for concrete aggregate and roadstone; smaller quantities were used for agricultural purposes, stone sand, asphalt fill, and lime manufacture. Much of the stone was sold to the Pennsylvania Department of Highways, local and nearby Government agencies, and the Maryland and Delaware State Highway Departments for road construction.

Anthracite was recovered by dredging.

A. T. Harris Sand Co. processed and sold industrial sand for use as fire or furnace material. Hempt Bros. (Elizabethtown) and Milton Grove Sand, Inc. (Milton Grove), continued to be the main sources of construction sands.

Output of both fire clay and miscellaneous clay continued to decline. Lack of orders forced the Whitaker Clay Co. to curtail mining during the second half of 1960. The Glen-Gery Shale Brick Corp., Ephrata Division, shut down its operation for approximately 3 months after a fire of undetermined origin swept through the plant May 15. Several of the nine kilns, drying rooms, a two-story processing building, and a conveyor bridge spanning the Reading Railroad track were damaged. Although much of the plant was destroyed, rebuilding was started immediately. Lancaster Brick Co. strip-mined clay for manufacturing building brick.

Hydrated lime for agricultural use was produced near Elverson by Amos K. Stoltzfus. Dead-burned dolomite for use as a refractory material was produced by J. E. Baker Co. at its rotary-kiln plant near Bainbridge.

Lawrence.—Shipments of portland and masonry cements decreased slightly in tonnage and value. Crushed captive cement rock was used to manufacture cement at the Bessemer plant of Bessemer Limestone

& Cement Co. Mostly Types I–II, air-entrained and non-air-entrained, and some Type III, non-air-entrained, portland cement was produced by the wet process. Some mortar cement also was produced. Three 235- by 10-foot rotary kilns and one 450- by 12-foot kiln were operated. Medusa Portland Cement Co. (Wampum) also manufactured mostly general-use and moderate-heat and high-early-strength portland cements and some masonry cement by the dry process. Two 390- by 12-foot rotary kilns were operated. A new regrinding and packing facility was completed at the Wampum plant. Major shipments from the Bessemer and Wampum plants were made by truck to ready-mixed concrete companies and concrete product manufacturers in Pennsylvania and Ohio.

Output of limestone was 2,913,000 tons, a slight increase over 1959; although value decreased slightly, the county ranked third in stone production. Five companies produced crushed limestone and cement rock, chiefly for blast-furnace flux, cement, concrete aggregate, roadstone, and dust for coal mines. The stone was quarried near Wampum, Hillsville, Bessemer, West Pittsburgh, and Mahoning Township. Mooney Bros. Supply Co. (West Pittsburgh) was a new limestone producer. Most of the county stone production was transported to consumers by rail.

Bituminous coal was mined from underground, strip, and auger mines. Thirty power shovels, 18 draglines and 25 bulldozers were used at the strip mines. Coal mined underground was mechanically loaded and mechanically cut; however, none of the production from the underground, strip, or auger mines was mechanically cleaned.

Lawrence County ranked fourth in clay output. Production of both fire clay and miscellaneous clay continued at a high rate and totaled 317,000 short tons, a 17-percent increase over 1959. Plastic fire clay, which was produced near Enon Valley by The Negley Fire Clay Co. and Natco Corp., was used in making refractories and heavy clay products. Metropolitan Brick, Inc., and Fenati Brick Co., Inc., produced both fire clay and miscellaneous clay for manufacturing building brick. Fenati Brick Co., Inc., curtailed operations for approximately 3 months following a fire in the machine room. The Bessemer Limestone & Cement Co. produced miscellaneous clay for use in manufacturing portland and other hydraulic cements; Keystone Loam & Clay Co. sold miscellaneous clay in bulk for use in foundries and steelworks.

Mooney Bros. Supply Co. produced sand and gravel for its own use. Superior Sand & Supply Co. and Mahoning Valley Sand Co. processed sand and gravel as building and paving materials.

D. M. Boyd produced humus peat from bogs near New Wilmington. Moore's Humus & Nursery recovered reed-sedge peat at a bog near Leesburg and sold the material in bulk.

Lebanon.—Bethlehem Cornwall Corp., subsidiary of Bethlehem Steel Corp., at the Cornwall underground mine 5 miles south of Lebanon, mined crude iron ore by block-caving and open-stope methods. The crude ore was processed at the Lebanon concentrator by flotation, magnetic concentration, and agglomeration, yielding iron ore, gold, silver, copper, cobalt, and pyrite.

Lebanon County ranked second in production and third in value of lime. H. E. Millard Lime & Stone Co. operated four rotary kilns and one continuous hydrator to produce quicklime and hydrated lime at its Annville plant. The quicklime and hydrated lime were sold chiefly for building, metallurgical, papermaking, and water purification uses; some quicklime was sold for agricultural purposes.

Limestone was crushed and sold or used chiefly for blast-furnace flux, manufacturing cement and lime, concrete aggregate, and roadstone. Total output was 1,670,000 short tons. Quarries were operated near Annville, Lebanon, and Cornwall.

Anthracite was recovered solely by dredging.

Lehigh.—Shipments from four cement manufacturers, declined slightly. Mostly captive cement rock was crushed and used for manufacturing general-use and moderate-heat, high-early-strength portland, and some mortar cements. Plants were operated near Coplay, Egypt, Fogelsville, and Cementon. Major shipments were by railroad, mostly in bulk to ready-mixed concrete companies, intrastate and to New Jersey, New York, and Ohio. Lehigh Portland Cement Co. installed an electrostatic precipitator at is Fogelsville plant at a cost of about $2 million. Giant Portland Cement Co. also installed dust-collecting equipment. A change in regulations permitted truck shipments, and cement companies were building truck-loading stations, storage silos for direct bulk loading into trucks, and other truck facilities.

Production and value of cement rock and limestone increased slightly; output totaled 2,234,000 short tons. The increase in production was attributed to a larger demand for limestone as road material. The Whitehall Cement Manufacturing Co. (Cementon), Giant Portland Cement Co. (Egypt), Lehigh Portland Cement Co. (Fogelsville), and Coplay Cement Manufacturing Co. (Coplay) produced and crushed cement rock or limestone at local plants solely for manufacturing cement. Lehigh Stone Co. (Ormrod) and Roy J. Kern (Guthsville), a new operator in the county, both operated stationary plants to produce crushed or broken limestone solely as concrete aggregate and roadstone. Some of the stone was sold to local Government agencies for road material. Penn Big Bed Slate Co. produced and processed slate at its No. 2 quarry near Slatedale, chiefly for structural and sanitary uses, blackboards and bulletin boards, and roofing slate.

Crude perlite mined in Colorado was expanded at the Pennsylvania Perlite Corp. Allentown plant and marketed for use as building plaster aggregate.

New Jersey Zinc Co. (Friedensville) mined crude zinc ore at its Friedensville underground mine by the room and pillar method. Zinc concentrate was shipped by truck to the company smelter at Palmerton. Operation of the mine was curtailed by a labor strike from August 5 to November 25.

Luzerne.—Luzerne County continued to rank second in production of anthracite. More than 70 percent of the anthracite produced from undeground mines, strip mines, and culm banks was shipped to consumers outside the producing region. Glen Alden Corp., Hudson

Coal Co., Jeddo-Highland Coal Co., Number One Contracting Co., and Susquehanna Collieries Co. were the leading producers.

Luzerne County ranked second as a sand and gravel producing county in northeastern Pennsylvania.

Sand and gravel sold principally for use as building or paving material totaled 429,000 tons and was processed at seven plants.

Four sandstone producers operated quarries at Kingston, Dupont, Sweet Valley, and White Haven. The output was crushed and sold or used solely as road material.

Blue Ridge Soil Pep Co., Inc., recovered humus peat from a bog near White Haven. Pennsylvania Peat Moss, Inc., produced moss, reed-sedge, and humus peat from bogs near White Haven.

Clay mined near Hazleton was used in manufacturing buff brick by Hazleton Brick Co.

Lycoming.—Lycoming Silica Sand Co. produced limestone from the Lime Bluff quarry (Muncy) and the Pine Creek quarry (Jersey Shore). The stone was crushed and sized at local plants chiefly for use as road material. In addition, limestone from the Pine Creek quarry was crushed and sold for agricultural purposes. A new pneumatic mill was installed at the Pine Creek plant. Susquehanna Quarry Co. operated a quarry and portable plant near Jersey Shore to produce limestone for road material. Both companies sold stone to nearby Government agencies for road construction. The Keystone Filler & Manufacturing Co. Muncy plant crushed and ground slate for use as flour. Callahan & Haines Stone Co. (Slate Run) produced dimension miscellaneous stone for flagging and rubble.

Lycoming Silica Sand Co. (Montoursville) produced building and paving sand and gravel, molding and engine sand, sand for use in preparing anthracite, and gravel for railroad ballast. J. A. Eck & Sons, Inc., produced building and paving material in Montoursville.

Bituminous coal was produced from three underground mines and three strip mines (one more strip mine than was active in 1959). The entire production from the underground mines was produced by hand methods. At the strip mines, three power shovels and two draglines were used. None of the coal produced was mechanically cleaned.

Tripoli (rottenstone) was quarried by Penn Paint & Filler Co. at the Sheddy quarry (Muncy) and by Keystone Filler & Manufacturing Co. at the Ramsey quarry (Antes Fort). The crude material was crushed, dried, and ground for use as an abrasive and filler.

McKean.—Plastic and burley fire clays produced by Kness Brothers (Mount Jewett) were marketed for use in manufacturing foundry refractories. Kaul Clay Products Co. used plastic fire clay from its Kaul stripping operation near Clermont to manufacture hot tops for steel mills. Hanley Co. recovered clay from an open pit at Lewis Run for use at a local plant in making building brick and marketed a small quantity for the production of floor and wall tile.

Bituminous coal was produced from strip mines. Six power shovels, one dragline, and six bulldozers were used at the strip mines. None of the coal produced was mechanically cleaned.

C. L. McGavern, Jr., produced and shipped molding sand from a plant near Eldred.

Mercer.—Three underground and six strip mines were active; 97 percent of the bituminous coal came from the strip mines. Five cutting machines and one loading machine were used underground; all the output was cut by machine, and 26 percent was loaded mechanically. None of the coal was mechanically cleaned.

Sand and gravel output totaled 315,000 tons in 1960. Sand and gravel processed as building and paving material and for miscellaneous uses was transported to local markets by truck.

White Rock Silica Sand Co. (Greenville) quarried and crushed sandstone principally for use as furnace or converter linings, road material, and in foundries. The Rock Kastle quarry (north of Volant) was not operated during the year.

Mifflin.—The Pennsylvania Glass Sand Corp. McVeytown plant processed sand for industrial uses. In addition to molding and engine sand, Miller Silica Sand Co., Burnham, and George E. Miller Coal Co. and James R. Klines Sons, both near Lewistown, processed construction material.

Bethlehem Limestone Co. operated the Naginey quarry near Milroy and crushed limestone chiefly for use as blast-furnace flux, concrete aggregate, roadstone, and stone sand. Ehrenzeller Lime Co. (McVeytown) and Honey Creek Lime Co. (Reedsville) quarried and crushed limestone for manufacturing lime. Quartzite, for use in manufacturing silica brick, was quarried near Hawstone by Haws Refractories Co.

Honey Creek Lime Co (Reedsville) operated a 10-pot kiln and a continuous hydrator to produce hydrated lime for agricultural purposes. Ehrenzeller Lime Co. burned and sold quicklime as agricultural lime at its 7-draw-kiln plant near McVeytown.

Monroe.—Hamilton Stone Co. (Bossardsville) quarried and crushed limestone for use as concrete aggregate, roadstone, and asphalt fill.

Universal Atlas Cement Division of U.S. Steel Corp. produced white clay near Kunkletown for use at its cement plant.

Output of sand and gravel declined in 1960. Sand, the major product, was used chiefly in cement and ready-mixed concrete.

Montgomery.—Production of stone in Montgomery County exceeded 4 million tons, a 9-percent increase over 1959, and the county continued to rank second in stone production. Two operators, near Conshohocken and Norristown, produced crushed and broken limestone for use as concrete aggregate and roadstone. Two quarries, near Plymouth Meeting and Bridgeport, yielded limestone principally for blast-furnace flux, concrete aggregate, roadstone, agricultural purposes, and manufacturing lime. Limestone quarried and crushed at a quarry near West Conshohocken was used for manufacturing cement. Fifty-three percent of the limestone was transported by truck and the remainder by rail and unspecified means.

Basalt, recovered from quarries near Perkiomenville and Saratoga, was crushed and broken for use as road material. Montgomery Stone Co., Inc., Montgomeryville, produced dimension basalt as dressed structural stone and crushed basalt for road material. Dimension sandstone for use as rough architectural blocks and refractory linings in steel-producing furnaces was quarried near Glenside by Fire Stone Products Co. Irregular-shaped rough construction dimension sandstone was quarried by Wm. Bambi & Sons, Inc. (Norristown). Vec-

chione Bros. (Glenside) produced dimension sandstone as irregular-shaped rough construction stone and rubble. Irvin B. Gill (E. Norriton Township) produced crushed and broken sandstone for road material.

Mignatti Construction Co., Inc. (Bethayres), produced crushed granite for use as concrete aggregate and roadstone and a small quantity of dimension stone for use as rubble. Marcolina Bros., Inc., operated the Hill Crest quarry near Laverock to produce dimension granite, which was used for building retaining walls. A. Manero & Sons (Glenside) produced miscellaneous dimension stone (mica schist) for use as rough and dressed construction stone. Spring House Quarry (Spring House) and M. & M. Stone Co. (Harleysville) quarried miscellaneous stone (argillite) solely for road material.

Allentown Portland Cement Co. continued to operate its West Conshohocken No. 2 plant, using captive cement rock and limestone to manufacture Types I–II general-use and moderate-heat, air-entrained and non-air-entrained portland cements and some masonry cement. Three rotary kilns were operated. The material was shipped by rail, mostly in bulk, chiefly to ready-mixed concrete companies.

Lime production increased 5 percent in quantity, but decreased 2 percent in value. G. & W. H. Corson, Inc., produced mostly hydrated lime for building and chemical and industrial uses, agricultural lime, and some dead-burned dolomite for refractory use. Six shaft kilns and three continuous hydrators were operated to produce the material.

Production of fire clay and miscellaneous clay totaled 87,000 tons, compared with 66,000 tons in 1959. Miscellaneous clay produced by the Keller-Whilldin Pottery Co. (North Wales), Norristown Brick Co. (Norristown), and Philadelphia Brick Co. (Trappe) was used at local plants to produce art pottery, flowerpots, building brick, and other heavy clay products. Robinson Clay Products Co. produced both plastic fire clay and shale at Pottstown to make vitrified sewer pipe at a local plant. Robinson Clay added six new 40-foot kilns for increased production of wedge lock-joint clay pipe.

The William Bambi & Sons, Inc., plant in Norristown, produced building sand and gravel.

Perlite mined in California and Nevada was expanded by The Philip Carey Manufacturing Co. (Plymouth Meeting) and Refractory & Insulation Corp. (Port Kennedy).

Montour.—Crushed and sized limestone was produced at a quarry and plant east of Milton by Lycoming Silica Sand Co. for use as road material and for agricultural purposes. Limestone, for use as concrete aggregate and roadstone, was quarried near Danville by Mausdale Quarry Co. Both companies sold road material to the Pennsylvania Department of Highways and to local municipalities and townships.

Construction sand and gravel was produced at the Thomas Sand & Gravel Co. Danville plant.

Northampton.—Northampton County continued as the leading cement-producing area, although the quantity and value of shipments decreased 15 percent and 17 percent, respectively. Ten companies operated 12 plants and manufactured cement from captive limestone

and cement rock, and from purchased materials. General-use, moderate-heat and high-early-strength portland cements and masonry cement were produced. Most of the cement was shipped by rail in bulk, mainly to ready-mixed concrete companies and manufacturers of concrete products. Plant operations were near Martins Creek, Northampton, Bethlehem, Bath, Sandts Eddy, Nazareth, and Stockertown. Keystone Portland Cement Co. (Bath) increased its storage capacity to 115,000 barrels by installing six new silos. A change in regulations permitted truck shipments and many of the cement companies built truck loading docks and storage facilities for finished cement.

Although tonnage declined 15 percent and value decreased 20 percent, Northampton County continued to lead in stone production. Twelve firms produced limestone and cement rock from 13 quarries: 4 near Nazareth, 2 near Bethlehem, 2 near Northampton, and 1 each near Bath, Sandts Eddy, Martins Creek, and Stockertown. The stone was used mostly at company plants for manufacturing cement, and as concrete aggregate, and roadstone. Smaller quantities were sold or used as stone sand, railroad ballast, and for agricultural purposes.

Northampton County was again the principal source of slate; production increased 8 percent in quantity and decreased 5 percent in value compared with 1959. Slate was recovered from 11 mines; 6 near Pen Argyle, 2 near Bangor, and 1 each near East Bangor, Bath, and Wind Gap. The processed slate was used chiefly for structural and sanitary ware, blackboards, standard roofing, and flagging.

Output of sand and gravel reached a new high as producers processed and shipped over 425,000 tons of material. Production was expected to go higher in 1961 when a new plant built by Saucon Sand Co., Inc., near Hellertown is completed. The plant was designed to meet specifications for fine aggregate for highways.

Anthracite was recovered by dredging.

Northumberland.—Anthracite production totaled 2,355,000 tons and was 13 percent of the State production. Fifty-six percent of the quantity produced was shipped outside the producing area, 44 percent was sold locally, and a very small quantity was consumed as colliery fuel. Leading producers were Reading Anthracite Co., Sayre Contracting Co., and Susquehanna Collieries Co.

Demand for shale was 14 percent greater than in 1959. Shale produced by Watsontown Brick Co. and Glen-Gery Shale Brick Corp., Watsontown Division, was used exclusively for manufacturing building brick. Watsontown Minerals Products Co. used shale from stock as a linoleum filler.

Limestone quarried near Herndon and Sunbury was crushed for use as road material, for agricultural purposes, and lime manufacture. Some of the roadstone was sold to local Government agencies.

M. E. Wallace Co. transported its entire output of molding sand by railroad. Trucks were used to transport building sand and sand for fill from Wilson's Sand Plant near Montandon.

Clyde Starook (Northumberland) burned quicklime for agricultural purposes in a pot kiln, using anthracite as fuel. The lime was sold to local consumers.

Perry.—Bradford Hills Quarry, Inc. (Newport), quarried and crushed limestone at its local plant for use as road material. Some of the stone was sold to local Government agencies and the Pennsylvania Department of Highways for road construction.

Philadelphia.—Dredging along the Delaware River by The Liberty Corp. (Philadelphia) yielded sand and gravel for use as building material.

Crushed noncommercial granite for riprap was produced by crews of the Philadelphia County Bureau of Highways.

Potter.—Dimension sandstone as curbing stone, irregular-shaped rough construction stone, and rough architectural blocks was recovered from two quarries near Austin. Carroll M. Winseck (Roulette) quarried dimension miscellaneous stone for use as flagging, and rough and dressed construction stone.

Schuylkill.—Schuylkill County continued as the leading anthracite-producing county. Anthracite production totaled 6,936,001 tons, compared with the 7,930,166 tons in 1959. Underground mines, strip pits, and culm banks were operated during the year. The five leading producers were Honeybrook Mines, Inc., Newkirk Mining Co., Mammoth Coal Co., Gilberton Coal Co., and Reading Anthracite Co.

Huss Contracting Co. (Andreas) and Pennsylvania Aggregates, Inc. (Summit Station) quarried and crushed limestone for use as road material. Stone was transported to consumers by truck. Quartzite, quarried and crushed for use in manufacturing silica brick, was produced at the Andreas quarry (Andreas) by Harbison-Walker Refractories Co.

Refractory Sand Co., Inc., transported its output of fire and furnace sand and sand for paving by railroad and trucks.

Various producers supplied Lehigh Materials Co. with shale for use in its lightweight aggregate plants. Auburn Brick Co. used its entire output of miscellaneous clay to manufacture building brick.

Snyder.—Output of shale increased slightly over that of 1959. Glen-Gery Shale Brick Corp., Beavertown Division, and Paxton Brick Co. used shale mined from open pits near Beavertown and Paxtonville, respectively.

Anthracite was produced by dredging.

National Limestone Quarry, Middleburg, quarried and sold crushed limestone for road material and agricultural purposes. Carton L. Comfort, Mount Pleasant Mills, quarried and crushed limestone solely for use in manufacturing lime. Quicklime, sold for agricultural purposes was burned at the company's local 6-pot kiln plant.

Central Builders Supply Co. processed and sold building sand and gravel from its stationary plant near Selinsgrove.

Somerset.—Somerset County again had the greatest number (101) of underground bituminous coal mines (2 less than in 1959). Underground production totaled 910,000 short tons; 84 percent was mechanically cut, and 51 percent was mechanically loaded, using 129 cutting machines and 82 loading machines. Approximately 16 percent of the output was mechanically cleaned, using wetwashing and pneumatic methods. Seventy-three power shovels and 31 draglines were used to produce 1.2 million tons of strip coal at the 43 active strip mines. One auger mine also was active in 1960, one less than in 1959.

Production of fire clay totaled 96,000 tons and was 18 percent higher than in 1959. Manufacturers used fire clay produced from two underground mines and three open-pit operations, mainly for refractories such as sleeves, nozzles, stoppers, and firebrick and block.

Keystone Lime Co. (Springs) quarried and crushed limestone locally for use as concrete aggregate and roadstone and for agricultural purposes. Somerset Limestone Co., Inc. (Bakersville), quarried and crushed limestone solely as road material.

Two plants near Boswell produced sand for general purposes. A third producer, near Springs, produced building sand and gravel for use in concrete products.

Sullivan.—Anthracite, the only mineral produced in the county, was mined underground and from strip pits. Output of anthracite increased substantially over that of 1959; however, the average value per ton declined from $8.69 in 1959 to $8.37 in 1960.

Susquehanna.—Dimension sandstone (bluestone) was quarried and sold or used mostly as flagging; smaller quantities were used for irregular-shaped rough construction stone and rubble. Seven quarries were operated near Springville, Kingsley, New Milford, Lakeside, Harford, and Brooklyn Township. Near Clifford crushed and broken sandstone for road material was recovered from the Bennett's quarry by Keelor Supply Co., Inc.

A small quantity of anthracite was produced.

Tioga.—Three underground mines and six strip mines produced bituminous coal. Sixteen power shovels and nine draglines were used at the strip mines.

Lyle R. Robinson (Elk Township) quarried dimension sandstone chiefly as flagging, and a small quantity for rubble.

Union.—Crushed limestone used mainly for concrete aggregate and roadstone was quarried near Mifflinburg and Winfield. Some roadstone was sold under contract to the Pennsylvania Department of Highways and to nearby townships and boroughs.

Venango.—Bituminous coal production from 11 strip mines (2 less than in 1959) totaled 588,000 short tons. Four draglines and 13 power shovels were used at the strip mines. Sixty-seven percent of the coal mined was mechanically cleaned, using jigs.

The Industrial Silica Division of the Pennsylvania Glass Sand Corp. produced molding sand and fire and furnace sand at its Venango works. Mrs. Ralph Vincent of Cambridge Springs, using portable equipment, processed bank-run gravel for sale to townships, boroughs, and builders. Oil City Sand & Gravel Co. dredged material near Oil City and processed it for sale as building and paving sand and gravel.

Warren.—Sand and gravel dredged by General Concrete Products Corp. was processed for use as building and paving material. Nelson & Ellberg produced construction sand and gravel at its plant near Warren.

Washington.—Washington County led in value of mineral output in the State; coal was the major commodity produced. Washington County led in both total and underground production of bituminous coal. Twenty-one underground mines produced 9.9 million short tons of coal. Virtually all the coal mined underground was mechanically cut and mechanically loaded. Twenty-two strip mines, one more than

in 1959, produced 991,000 short tons of coal. Ten draglines, 37 power shovels, and 48 bulldozers were used at the strip mines. Most of the coal mined and coal shipped in from Greene and other counties was mechanically cleaned. Maple Creek mine of U.S. Steel Corp. was reported to be the first underground mine to use alternating current in the State to power continuous mining equipment.

Limestone for concrete aggregate and roadstone was quarried near Washington by Westmoreland Clay Products Co.

Combined output of miscellaneous clay by Westmoreland Clay Products Co. (Washington) and Monongahela Clay Products, Inc. (Monongahela), was 29,000 tons, 28 percent less than in 1959. The entire quantity was used in manufacturing building brick. Donley Brick Co. produced red shale from its open pit near Washington. The Haas Refractories Co. completed major alterations required to convert its Canonsburg plant (formerly known as the W. S. George Pottery Co.) from producing pottery to manufacturing pouring-pit refractories.

Wayne.—Paul Thompkins Estate, W. R. Strong, and Walter C. Blum (Lookout) reported output of dimension sandstone chiefly for flagging. Wayne Concrete & Sand Works, Inc. (Lake Ariel), produced and sold crushed and broken sandstone solely for road material. Some noncommercial sandstone was produced for road material.

Wayne Peat Moss Co. recovered humus peat from bogs at the southern tip of the county near Gouldsboro.

Most of the anthracite produced was sold locally.

Willis R. Black supplied farmers in the area with building sand and gravel and gravel for fill.

Westmoreland.—Forty-eight underground bituminous coal mines, 20 strip mines, and 2 auger mines were active. Almost all the bituminous coal mined underground was cut and loaded mechanically. A total of 22 power shovels and 3 draglines were used at the strip mines to produce 252,000 tons of coal.

Penn Aggregates (Jeannette) produced crushed limestone solely for road material, and sold stone to the Pennsylvania Department of Highways for road construction. John C. Beaumont and Ray Brant-hoover (both near Belle Vernon) quarried dimension sandstone for rubble. Four producers operated quarries near Ligonier, Greensburg, and Baggaley to produce crushed and broken sandstone solely for road material. J. G. Robinson, Inc., produced and sold or used dimension sandstone for use as flagging. Dimension miscellaneous stone quarried at Lynn's Quarry, Belle Vernon, also was used as flagging.

York.—Medusa Portland Cement Co. remained the only cement producer in the county. Six rotary kilns were operated at the York plant to produce waterproof white and gray portland cements and mortar cement. The cement was shipped by rail, mostly in bulk, to ready-mixed concrete companies and manufacturers of concrete products. A new finish mill was completed in anticipation of enlarged production capacity.

Due to decreased tonnage and value (19 percent and 13 percent, respectively), York County dropped from third in 1959 to fourth in stone production. Limestone was quarried at 10 operations: 7

near York, and 1 each near Mount Wolf, Wrightsville, and Thomasville. The chief uses for the stone were as concrete aggregate, roadstone, lime and cement manufacture, and open-hearth and blast-furnace flux. Smaller quantities were sold or used for agricultural purposes and as railroad ballast. Slate was crushed and ground at the Delta plant of Funkhouser Mills, Division of The Ruberoid Co., and marketed as natural granules and flour. Some of the slate flour was exported.

York County ranked second in value of lime production, but tonnage and value decreased slightly compared with 1959. J. E. Baker produced dead-burned dolomite for refractory material at its York plant. Shipments were mostly to points in Pennsylvania, Maryland, Ohio, and Delaware, but some of the material was exported.

Combined output of three companies totaled 280,000 tons of sand and gravel. It was 33 percent below the high established in 1959.

Medusa Portland Cement Co. produced miscellaneous clay for its own use. Shale produced by the York Colonial Division, Glen-Gery Shale Brick Corp., was used to manufacture building brick.

General Mining Associates (Glenville) was the only mica producer in the State. The fine mica (sericite) schist was processed by drying and air separation and was used for filler purposes.

Pennsylvania Perlite Co. (York) expanded perlite shipped from Colorado.

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